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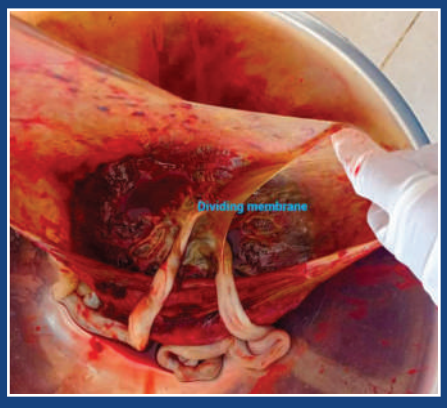

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EDITORIAL

Women's and Adolescent Health in Low-Resource Settings

This issue presents six original articles and two case reports from Ethiopia, Uganda, and Guinea, addressing reproductive health across the female life course, from adolescence to menopause. The contributions underscore persistent gaps in knowledge, quality of care, and health system responsiveness, and provide context-specific evidence to guide policy and clinical practice.

A multicenter Ethiopian study shows that fewer than half of postpartum women intended to use the Lactational Amenorrhea Method, with intention strongly influenced by awareness, urban residence, and prior use, underscoring the need for structured postpartum counseling, especially for rural women. Adolescent vulnerability is highlighted by a study from Eastern Ethiopia, where nearly one in three female high school students reported sexual abuse, driven by complex social and structural factors that require coordinated, multi-level interventions.

Evidence from Uganda demonstrates that induction of labour is largely successful in low-resource settings when guided by evidence-based criteria, reinforcing the importance of quality antenatal and intrapartum care. The importance of effective communication is further emphasized by an Ethiopian mixed-methods study showing that most antenatal counseling questions for fetal anomalies are appropriate and well understood, while identifying opportunities to strengthen patient-centered counseling.

Preventable maternal mortality remains a major concern, as shown by findings from Guinea on eclampsia-related deaths, highlighting the need to strengthen antenatal care, referral systems, and access to emergency obstetric services.

Attention to women's health beyond the reproductive years is provided by a study on menopause in Addis Ababa, which reports early age at menopause and a high prevalence of premature menopause, underscoring unmet needs in midlife care.

Finally, two case reports illustrate rare but catastrophic obstetric complications, emphasizing the need for heightened clinical vigilance.

The Editorial Board believes this issue offers important clinical and public health insights for readers.

Wondimu Gudu (Editor in chief)

Ethiopian Journal of Reproductive Health

INTENTION TO USE THE LACTATIONAL AMENORRHEA METHOD FOR FAMILY PLANNING AMONG POSTPARTUM WOMEN IN ETHIOPIA: A MULTICENTER STUDY

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ABSTRACT

BACKGROUND: Although the Lactational Amenorrhea Method (LAM) is one of the safest family planning methods, there is limited evidence regarding intention of women to use it and its associated factors in many settings, including Ethiopia. This study was conducted to assess postpartum women's intention to use LAM and the factors associated with it in Ethiopia.

METHODS: A multi-center hospital-based cross-sectional study was conducted on postpartum women who gave birth in six referral hospitals in Ethiopia. Data were collected through face-to-face interview at discharge. Data were analyzed using Stata 17, with descriptive statistics applied as appropriate. The proportion of women intending to use LAM was presented as a percentage, while multivariable logistic regression was applied to identify predictors of this intention. The results were reported using adjusted odds ratios, along with 95% confidence intervals (CIs), and statistical significance was declared at a p-value < 0.05.

RESULTS: Among the 3,319 women approached, 3,148 (94.8%) responded. Among the postpartum women interviewed, 41.8% intended to use LAM. Most were 21-30 years (72%), urban (92%), & had vaginal deliveries (78%). Intention to use LAM was associated with urban residence (AOR= 2.38; 95% CI: 1.29–4.41), hearing about the importance of LAM (AOR= 1.97; CI: 1.28–3.02), and a history of LAM utilization (AOR= 1.65; 95% CI: 1.13, 2.40).

CONCLUSION: The intention to use the LAM for family planning remains low in Ethiopia. Key factors associated with this intention include place of residence, knowledge about LAM, and prior experience with the method. To increase both the intention to use and the actual utilization of LAM, targeted counseling within family planning programs is essential.

KEYWORDS: Lactation Amenorrhea Method, Contraception, Breastfeeding, intention, Ethiopia

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INTRODUCTION

Globally, contraceptive use plays a critical role in improving maternal and child health; in 2022 alone, it prevented more than 141 million unintended pregnancies, 29 million unsafe abortions, and nearly 150,000 maternal deaths[1]. Despite these gains, unmet postpartum family planning remains a major public health challenge worldwide, with more than half of postpartum women lacking contraception despite a desire to delay or avoid subsequent pregnancies and according to World Health Organization, in the year 2021 about 164 million reproductive age women have an unmet need for contraception[2,3]. The burden is disproportionately higher in Africa, particularly in sub-Saharan Africa, where up to 80% of postpartum women experience unmet need for contraception[4,5]. Evidence from a scoping review conducted in low- and middle-income countries further shows that unmet need for family planning among reproductive-age women ranges from 20% to 58%[6]. In Ethiopia, despite notable expansion of family planning services, unmet postpartum family planning remains substantial; an umbrella review reported that postpartum family planning utilization is only 36.4%, contributing to persistently high risks of adverse maternal and neonatal outcomes[7].

With the continued high number of unmet need for contraception in low income countries, particularly in Ethiopia, there are still high burden of unintended pregnancies, with their associated morbidities and mortalities, for which postpartum period is an ideal time to start family planning[8–10]. As such, postpartum counseling and supporting women to start family planning are routine hospital discharge components to address high unmet demands[11–13]. Since most immediate postpartum women are breast-feeding, and seek child spacing, it will be good to counsel the women about postpartum family planning methods, including the LAM[14]. LAM is a highly effective type of contraception where physiology is used for child spacing, with a failure rate of less than 2% within six months of delivery[15–17]

Understanding a woman's contraceptive intention, such as for the LAM, is essential for predicting and promoting future use. This focus justified by the Theory of Planned Behavior, which identifies intention as a key cognitive precursor to action[18,19]. The theory highlights motivational factors such as attitudes, social pressure, and perceived control that influence a person's decision-making process before taking action. Measuring intention and its determinants enables targeted counseling to influence underlying attitudes, norms, and perceived control[19]. In Ethiopia, the intention to use contraception varies significantly, ranging from 84.3% in Axum to 38% in Woliata, with a national average of 44.4% and notable regional clustering[20–22]. These pronounced sub-national disparities, set against a sub-Saharan African average of 45.8%, underscore the critical need to investigate the factors shaping intention in order to design effective, location-specific family planning interventions[23,24]. While studying intention is important and various studies have examined women's intention to use contraception, we could not find a study specifically assessing women's intention to use LAM[10,21,25,26].

Different studies have identified several predictors that affect women's intention to use contraception, including postpartum resumption of sexual activity, obtaining husband approval, educational status, age, employment, and knowledge about contraception[20,22,23,27]. Since LAM is one of the most effective contraception methods, factors influencing the intention to use other types of contraception may also affect the intention to use LAM. However, no specific study has been conducted on women's intention to utilize LAM[28,29].

Although LAM is being cited as one of the effective and safest family methods and Ethiopia is believed to have one of the highest exclusive breast feeding practices, study on women's intention to use LAM and factors associated with this is rarely documented in Ethiopia[30]. Therefore, this study aimed to assess the intention to use LAM and identify factors associated with it among postpartum women in Ethiopia.

Methods

Study design and setting

A multi-center, hospital-based cross-sectional study was conducted among postpartum women who gave birth in six referral hospitals across Ethiopia. This study was part of a larger cohort study on the effectiveness of LAM in Ethiopia[17,31]. The research involved hospitals from diverse geographical regions across eastern, western, southern, northern, and central Ethiopia. The participating hospitals included: Hiwot Fana Specialized University Hospital (Harar), Karamara Hospital (Jigjiga), Saint Paul Millennium Medical College (Addis Ababa), Hawasa University Referral Hospital (Hawassa), Gondar University Hospital (Gondar), and Jimma Medical Centre (Jimma). The study was conducted from March 1, 2017, to December 31, 2018.

Population and sampling

Study population: The study population were all women who gave birth within seven days prior to the data collection in the selected hospitals and their catchment health centers.

Sample size and sampling procedure: The sample size for the study was calculated with the following assumptions: 95%, Z = 1.96, and a 2% margin of error was selected to improve the precision and reliability of the estimates, given the public health importance of the outcome and the need for accurate prevalence and association measures, proportion of women who correctly used LAM (26%)[16], 20% non-response, and a design effect of 1.5 (n=3319).

During the study period, we randomly selected five regional states (Amhara, Oromia, SNNPR, Harari, and Somali) and one city administration (Addis Ababa) from a total of nine national regional states and two city administrations. From each selected region and city administration, we purposively chose one referral hospital based on its annual delivery rates: Gondar University Hospital from Amhara, Jimma University Hospital from Oromia, Hawasa Referral Hospital from SNNPR, Hiwot Fana Hospital from Harari, Karamara Hospital from Somali, and SPMMCH from Addis Ababa. Additionally, we selected the five nearest health centers to each of the chosen hospitals. The calculated samples were proportionally allocated to the selected health facilities, and within each facility, simple random sampling was used to select postpartum women for inclusion in the study.

Data collection tools and procedures

A standard structured questionnaire, adapted from the 2016 Ethiopian Demographic and Health Survey, was used to collect information through interviews with participants at discharge. The tool was initially written in English and then translated into three local languages (Amharic, Afan Oromo, and Af-Somali) by two health professionals fluent in the respective languages. The accuracy of the translations was verified by back-translating the documents into English. From each hospital, three midwives (18 midwives total from six hospitals) fluent in the local languages were selected and trained on the purpose of the research, the data collection tools, and how to input data using ODK Collect. Data were gathered using ODK Collect on smart tablets. A pretest was conducted with 5% of the sample population at a hospital not included in the study prior to the actual data collection. The adequacy of the checklist was evaluated, and any ambiguous questions were revised. Additionally, daily checks were performed by the respective site supervisors to ensure accuracy and consistency.

Variables and measurements

Dependent variable: Intention to use LAM in the first six months postpartum.

Independent variables: Sociodemographic factors (age, residency, educational status, husband's educational status, income); obstetric factors (gravidity, parity, place of delivery, mode of delivery); and information on contraception (FP counseling, awareness of contraception, prior use of LAM).

Operational definition:

Intention to use LAM: Women were classified as intended users of LAM if they answered "yes" to the

question, "Do you intend to use LAM for the first six months postpartum?"

Data analysis

All collected data were cleaned by a statistician in MS Excel and then exported to Stata 17 for analysis. Descriptive statistics, including frequency and proportion, were used to summarize categorical variables, while the mean and standard deviation were used to summarize continuous covariates. Before finalizing the model, multicollinearity was assessed using variance inflation factor (VIF) and tolerance values, with no evidence of problematic collinearity among predictors. Model fit was evaluated using the Hosmer–Lemeshow test and other fit statistics, indicating an adequate fit to the data. Confounding was assessed by comparing crude and adjusted odds ratios, with variables that caused meaningful changes in estimates retained in the final model. A variable with a p-value of < 0.25 in bivariate analysis was entered into the multivariable model. Additionally, factors associated with the intention to use LAM were described using the adjusted odds ratio (AOR) along with its 95% confidence interval. Statistical significance was set at $p < 0.05$ in the multiple logistic regression.

Ethical considerations

Ethical approval for this study was secured from the Institutional Health Research Ethics Review Committee of the University of Gondar (Ref No: O/V/P/RCS/05/3073/2017), whose lead approval covered all study sites, with written agreement obtained from each participating institution. All participants were informed of the study's purpose and provided voluntary written informed consent. To ensure confidentiality, interviews were conducted in a private consultation room at the time of discharge. Data were collected using ODK Collect on password-protected tablets, with only participant study IDs recorded, ensuring no personally identifiable information was stored.

Patient Public Involvement

No patient or public was involved in the conception or design of this study.

Results

Socio demographic and Reproductive characteristics Among the 3,319 women approached, 3,148 (94.8%) were included in the study. The majority of the participants were aged 21–30 years, urban residents (%), and had given birth vaginally (%). Although most of the women had heard about LAM (%), they did not utilize it Table 1 and 2.

Table: 1 Sociodemographic characteristic of postpartum women in Ethiopia (n=3148).

Variables	Frequency	Percent
Age		
15- 20	518	16.45
21-25	1,164	36.98
26-30	1,092	34.69
31-35	258	8.20
36-40	116	3.68
Residence		
Rural	249	7.91
Urban	2,899	92.09
Maternal Education		
No formal education	794	25.22
Read and write	126	4.00
Primary	662	21.03
Secondary	860	27.32
College and above	706	22.43
Husband occupation		
Farmer	322	10.46
Government employee	1,134	36.84
Private	443	14.39
Merchant	455	14.78
Other	724	23.52

Table 2: Reproductive and obstetric characteristics of postpartum women in Ethiopia (n=3148).

Variables	Frequency	Percent
Place of delivery		
Health center	72	2.29
Hospital	3,076	97.71
Mode of delivery		
Cesarean section	690	21.92
Vaginal	2,458	78.08
Received Family Planning counseling during ANC		
No	522	28.62
Yes	1,302	71.38
Heard of LAM		
No	936	32.55
Yes	1,940	67.45
Ever used LAM		
No	1,285	67.49
Yes	619	32.51

LAM=lactation amenorrhea method; ANC=antenatal care,

Intention of LAM use

Among the participants, 1,317 women (41.8%; 95% CI: 40.12-43.56) expressed an intention to use LAM for postpartum family planning within the first six months after giving birth. In the adjusted multivariable logistic regression model, three key factors remained significantly associated with this intention: the woman's place of residence, her prior knowledge of LAM, and her history of ever using LAM.

Women residing in urban areas had 2.38 times higher odds of the outcome compared to those living in rural areas (AOR = 2.38; 95% CI: 1.29–4.41). Additionally, women who had heard about LAM had nearly double the odds of the outcome compared to those who had not (AOR = 1.97; 95% CI: 1.28–3.02). Furthermore, mothers who had ever used LAM were significantly more likely to achieve the outcome than those who had never used it (AOR = 1.65; 95% CI: 1.13–2.40)(Table 3).

Table 3: Factors associated with intention to use LAM in Ethiopia (n=3148).

Variables	P- value	COR (95% CI)	P- value	AOR (95% CI)
Maternal education				
No formal education		1		1
Read and write	0.050	1.47 (1.00, 2.18)	0.147	2.06 (0.77, 5.52)
Primary	0.000	0.51 (0.41, 0.63)	0.878	1.03 (0.65, 1.64)
Secondary	0.000	0.43 (0.35, 0.52)	0.880	0.96(0.59, 1.56)
College and above	0.000	0.44 (0.36, 0.55)	0.120	0.66 (0.40, 1.11)
Husband's occupation				
Farmer		1		1
Government employee	0.801	1.03 (0.80, 1.32)	0.897	1.16 (0.60, 2.27)
Non-government organization	0.008	0.67 (0.50, 0.90)	0.211	1.59 (0.76, 3.30)
Merchant	0.433	0.89 (0.66, 1.18)	0.387	1.33 (0.69, 2.59)
Other	0.733	1.04 (0.80, 1.36)	0.537	1.22 (0.64, 2.31)
Residence				
Rural		1		1
Urban	0.061	1.34 (0.98, 1.84)	0.027	2.38 (1.29, 4.41)
Mode of delivery				
Caesarean section		1		1
Vaginal	0.031	2.03 (1.02, 1.43)	0.175	1.08 (0.74, 1.53)
Family planning counseling during ANC				
No	1		1	
Yes	0.001	0.71 (0.58, 0.87)	0.072	1.29 (0.87, 1.90)
Heard of LAM				
No	1		1	
Yes	0.000	3.19 (2.68, 3.80)	0.000	1.97 (1.28, 3.02)
Ever used LAM				
No	1		1	
Yes	0.000	3.33(2.70, 4.11)	0.000	1.65 (1.13, 2.40)

LAM, lactation amenorrhea method; ANC, antenatal care

DISCUSSION

This study assessed the intention to use LAM among postpartum women in Ethiopia. We found that 41.8% of participants intended to use LAM, with urban residence, prior knowledge of LAM, and a history of LAM use identified as key associated factors.

The proportion of women intending to use LAM in this study is comparable to various national and international studies assessing women's intentions to use contraception. For instance, a study conducted in Adigrat found that 48.4% of women intended to use long-acting contraception[21]. Another study in Ethiopia indicated that, based on the theory of planned behavior, women's intention to use contraception was 46.4%[18]. Additionally, a systematic review in Sub-Saharan Africa found that the intention to use postpartum family planning was 62.2%[26], while the global pooled prevalence of women's intention to use family planning was 42.8%[32].Although the prior studies examined contraceptive intention in general, LAM constitutes a unique subset that may attract women for specific reasons not applicable to other modern methods. These include its immediate availability, alignment with cultural and religious norms, documented health benefits for mother and child, and its inherent support for optimal breastfeeding[33–37].

The finding that women living in urban areas intended to use LAM more than rural women may seem counterintuitive, given that rural areas often have higher breastfeeding rates. However, this intention is influenced by a complex interplay of knowledge, access, socioeconomics, and reproductive contexts. This may be related to access to health information and counseling, higher education, and the need for a planned temporary contraceptive method within a modern family planning framework. It is important to note the gap between intention and correct practice, as urban knowledge does not always translate to perfect adherence, while rural practices may be effective even without formal knowledge[37–39].

As anticipated, women who are knowledgeable about and have previously used LAM are more likely to intend to continue using it. Since LAM has no side effects and is more readily available than hormonal or other modern contraceptives, these women are more inclined to keep using it. Additionally, a study conducted in Addis Ababa, found that contraceptive use during the most recent pregnancy influences the current utilization of any type of family planning, supporting the conclusions of this study. Furthermore, another study indicates that the use of family planning after upcoming deliveries may depend on past family planning practices[40,41].

Strength and limitation of the study

Our study has several strengths. Firstly, it was a multi-center study conducted in randomly selected settings throughout Ethiopia, accounting for diverse socio-cultural contexts. Secondly, the sample size is substantial, and lastly, it encompasses women who delivered in both hospitals and health centers, enhancing the generalizability of the findings to the broader population of Ethiopian women. However, the study also has several limitations. First, the overrepresentation of urban women (90% of participants) may limit the applicability of our results to rural settings. Second, the timing of data collection (immediately postpartum) means that reported intentions could change as women recover. Third, the cross-sectional nature of the study limits inferences about causality. Finally, potential recall bias may affect the recollection of factors influencing contraceptive intention, as this could be influenced by the recent childbirth experience.

Conclusion and Recommendation

The intention to use the LAM for family planning remains low in Ethiopia. Counseling about family planning, including LAM, is important for increasing its intention to utilization, especially for those with limited access to and who do not wish to use other modern contraceptives Additionally, incorporating structured LAM counseling into discharge procedures could improve adoption. This

study's findings on factors influencing postpartum women's intention to use the LAM suggest several program implications. To move from intention to correct use, a multi-level strategy targeting the health system, providers, and the community is needed.

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No competing financial interests exist.

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Abbreviations:

LAM:	Lactational Amenorrhea Method
CI:	Confidence Interval
AOR	Adjusted Odd Ratio
SPMMCH:	Saint Paul Millennium Medical College Hospital
SNNPR:	Southern Nations, Nationalities, and Peoples' Region
ODK:	Open Data Kit
ANC:	Antenatal Care

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MAGNITUDE OF CHILD SEXUAL ABUSE AND ASSOCIATED FACTORS AMONG HIGH SCHOOL FEMALE STUDENTS IN ADAMA, EASTERN ETHIOPIA, 2023: AN INSTITUTION BASED CROSS-SECTIONAL STUDY

Kalkidan Jembere[1] & Dereje Bayissa Demissie[2]

ABSTRACT

BACKGROUND: Child sexual abuse is one of the most serious public health issues in Africa, including Ethiopia. Moreover, little has been explored about childhood sexual abuse in the context of high school students in.

OBJECTIVES: The aim of this study was to assess the magnitude of sexual abuse and associated factors among high school female students in Adama, Eastern Ethiopia, 2023

METHOD: An institutional-based cross-sectional study design was employed among 410 randomly selected female students. A pre-tested structured and self-administered questionnaire was used for data collection, and the collected and cleaned data was exported to SPSS 26 for further analysis. Hosmer and Lemeshow model fitness was checked. Both binary and multivariable logistic regression analysis were used to identify independent predictors at (p.value of 0.05) with AOR and 95% CI.

RESULTS: The mean age of the study respondents was 17.2 years. The magnitude of child sexual abuse among female high school students in Adama town was 32.9% (95% CI 27.9, 37.9) who had experienced child sexual abuse. Among the major reported types of child sexual abuse 134 (32.9%) had verbal harassment, 122 (29.8%) had faced touching or body contact harassment, and 79 (19.3%) had child sexual abuse. Cases involving two or more types are considered overlapping. This study identified that overlapping child sexual child abuse showed that 24.4% overlapped by at least two and 16.3% overlapped by all three types of harassment. This study identified several factors significantly associated with child sexual abuse: rural residence (AOR = 5.87; 95% CI: 1.91–18.02), family size ≥ 5 (AOR = 2.39; 95% CI: 1.04–5.48), alcohol consumption (AOR = 2.24; 95% CI: 1.05–4.74), sexual debut (AOR = 5.48; 95% CI: 3.21–9.37), non-consensual sexual debut (AOR = 12.9; 95% CI: 5.24–31.76), and lack of parent-child discussion on sexual and reproductive health (AOR = 1.96; 95% CI: 1.23–3.12).

CONCLUSION AND RECOMMENDATION: The magnitude of child sexual abuse among female students in this study was 33%. Factors associated with child sexual abuse were: rural residence, large family size alcohol use, early sexual debut, and poor parent-child communication. Multi-level interventions including school education, family engagement, and raising community awareness must be implemented to address them.

KEY WORDS: Child; Sexual abuse; High school; Female students; Adama

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INTRODUCTION

Child sexual abuse refers to the involvement of a child under 18 in sexual activities that violate societal laws or taboos, which they may not fully comprehend, consent to, or give informed consent to. This can occur by adults, other children in positions of responsibility, trust, or power, or by incest, which involves abuse by a family member or close relative[1].

Children can be sexually abused by both adults and other children who are by virtue of their age or stage of development in a position of responsibility or trust or power over the victim and also by incest which involves abuse by a family member or close relative[2].

According to Lin et al. (2025), global Child Sexual Abuse (CSA)-related deaths decreased from 260 to 187 (–28%), while Disability-Adjusted Life Years (DALYs) increased from 2.54 million to 3.69 million (+45%). The age-standardized mortality rate declined (EAPC –2.4%), whereas the age-standardized DALY rate rose slightly (EAPC +0.5%). Although males accounted for higher absolute counts, females exhibited a steeper growth in DALYs (+51% vs +40%) [3].

In Asia, the prevalence of Child Sexual Abuse (CSA) among females ranges from 3.3% to 42.7% in countries such as China and India, while among males it varies between 4.3% and 58% in regions including Hong Kong and Sri Lanka. Rates differ significantly between contact and non-contact forms of abuse, reflecting variations in cultural, social, and reporting practices[4]. The magnitude of child sexual abuse in Brazil was 41.8%[5].

A review of literature on the prevalence of Child Sexual Abuse (CSA) in Africa found that rates among females range from 2.1% to 68.7% in countries such as Tanzania and Ethiopia, while among males, prevalence varies between 4.1% and 60% in South Africa[4]. Additionally, a study in South Africa reported that 14.61% of girls experienced some form of lifetime sexual victimization[2]. A systematic review and meta-analysis conducted in Ethiopia reported that the pooled prevalence of child sexual abuse among female students was 36.83% (95% CI: 24.35–49.32)[6]. The magnitude of child sexual abuse in Ethiopia, Addis Ababa 42.7%[7] and in Dire Dawa 48.9%[8].

A study in Ethiopia found that 48.2% of children experienced sexual abuse, with 12% being raped completely, mostly female[9]. Sexual abuse exposes children to risky situations, often in isolation with potential abusers. Identifying such abuse is challenging as behaviors may occur in unaffected children. It can occur at any age and can be identified through physical signs, behavioral changes, and emotional changes[9]. Sexual violence can lead to physical injury, sexually transmitted infections, emotional trauma, and even death. To prevent child abuse, strategies like strengthening economic support, changing social norms, providing quality care and education, enhancing parenting skills, and intervening can help reduce harm and prevent future risks[10]. Sexual violence has numerous and serious immediate and long-term consequences. These include physical injury, sexually transmitted infections (including HIV/AIDS), emotional trauma and even death[11].

Despite its magnitude, CSA remains one of the most overlooked and underreported forms of violence in Ethiopia, particularly among adolescent girls[12]. While some studies have explored Child Sexual Abuse (CSA) in Ethiopia, little is known about its magnitude among high school students in Adama town, a rapidly growing urban center with unique socio-cultural dynamics. Addressing this gap is critical for designing targeted interventions and informing national strategies to protect vulnerable adolescents. The aim of this study was to assess the magnitude of child sexual abuse and associated factors among female high school students in the Adama town, Eastern Ethiopia.

Methods

Study setting, population and design

The study was conducted from February 1-20, 2023 at public schools in Adama town, East Showa,

Oromia region, Ethiopia. The town has 25 private and 10 governmental secondary schools, with 7081 students attending at Goro and Adama Secondary School.

Goro Secondary High School has 3,334 students, while Adama Secondary High School has 3,749 students. An institution-based cross-section study design was conducted. All high school female in the academic year 2022/2023 were source populations and study population were high school female students who were randomly selected from the source population and met the inclusion criteria. All regular students at Adama able to give Assent were included and critically ill students, night and weekend students were excluded.

Sample size determination and sampling procedure

The sample size was calculated using a single population proportion formula, referencing a previous study conducted in Dire Dawa town with a prevalence of 48.9% (8) at a 95% confidence level. After adding a 10% non-response rate, the initial sample size was 422. Further calculations considered key factors such as living alone, rural residence, living with a single parent, age above 15 years with adjusted odds ratios (AOR) of 2.27 and confidence intervals provided for each. Among these, the largest sample size requirement was for the age group above 15 years (445 participants). Therefore, the final sample size for this study was set at 445, ensuring adequate power for both primary and secondary objectives.

Sampling Approach

The study was conducted in Adama town, which has 10 public high schools. From these, two schools Goro Secondary School (total students = 3,334) and Adama Secondary School (total students = 3,749)—were selected. The combined population of female students in these two schools was 4,416 (Goro = 2,227; Adama = 2,189). A proportional allocation method was applied to determine the number of participants from each school, followed by simple random sampling to select the study subjects. Accordingly, 225 female students were sampled from Goro Secondary School and 220 from Adama Secondary School, resulting in a total sample size of 445. See details in figure 1.

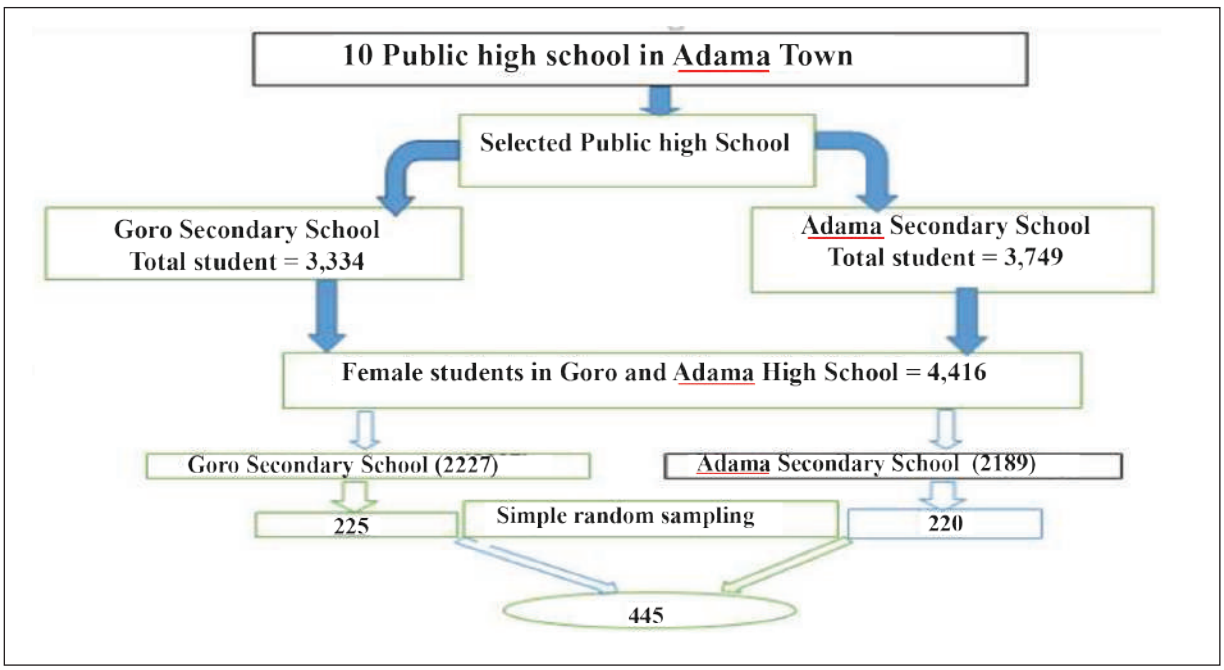

Figure 1: Schematic presentation of sampling procedure of female students at Adama High School 2023

Operational Definitions

Child sexual abuse (CSA) refers to any sexual activity involving a child (typically under 18 years) where consent is not or cannot be given. It includes acts intended for sexual gratification by an adult or older individual, such as verbal harassment, inappropriate touching, or forced sexual intercourse[9].

Sexual contact: Intentional touching of a victim's, defendants, or the other person's intimate elements for the aim of arousal[9].

Rape: To commit sex exploitation force that the kid does not need to and is not ready to defend himself/herself[9].

Incest: human sexual activity between family members or close relatives (blood relations)[9]

Substance abuse: is when children use alcohol, chat, and/or cigarette on their daily basis to relieve from their daily problems encountered[9]

Verbal Harassment: Verbal harassment refers to any sexually explicit comments, propositions, or verbal intimidation directed at a child. This includes, but is not limited to: Sex-related jokes or remarks, insults with sexual connotations, making sexual comments about a person's body or clothing, and unwelcome invitations to date or engage in sexual activity(9).

In this study, child sexual abuse (CSA) is measured as the presence of one or more reported experiences of sexual harassment. These include: verbal harassment, defined as sexually explicit comments, propositions, or verbal intimidation directed at the child; touching or body contact harassment, which involves unwanted physical contact with sexual intent such as fondling or groping; and vaginal intercourse harassment, referring to forced or coerced vaginal penetration. A participant is classified as having experienced Child Sexual Abuse (CSA) if they report at least one of the three forms of abuse. Cases involving two or more types are considered overlapping.

Data collection tools, collection procedures, and quality control

The tool was adopted from reviewing different literatures, previous similar studies, which organized according to the objectives of study. A pre-tested structured and self-administered questionnaires were used as a data collection instrument which was partly adapted from the standard "childhood experience of care and abuse Questionnaire (CECA.Q)[13]. Data were collected by using self-administered pre tested structured initially prepared in English. The tool was prepared was in English language and then translated into Afan Oromo and Amharic by language experts and again translated back to English to maintain consistency. Data was collected using self-administered structured questionnaire. Three data collectors and three data facilitators were recruited from fourth year Midwifery students; training was given on how to encode and refill data on questionnaires, for one day prior to data collection period, by the principal investigator.

Data Processing and Analysis

The data was checked for completeness, compiled, coded, entered and cleaned by Epi-data version 4.6 and exported to SPSS 26 version for further analysis. Descriptive statistics was used Hosmer and Lemeshow model fitness was checked. Both binary and multivariable logistic regression analysis were used to control the effects of confounding variables and to identify independent predictors of child sexual abuse experience. At statistical significance level cut off of ($p < 0.05$) was used.

Results

Socio demographic characteristics of participants

The completed response rate was 92% (410/445). The mean age of the study respondents was 17.2 years old with age range from 15 to 20 years old. The majority were single (89.8%), 71.1% lived in urban areas, 65.9% lived with both parents, and 52.7% slept with their mother at home. The average monthly family income of the study participants was 7,457.32 Birr. Income distribution showed that the majority of households (63.2%) earned 7,801 Birr or more per month while smaller proportion reported lower incomes: 8.5% earned 3,200 Birr or less (Table 1).

Table 1: Socio-demographic Child Sexual Abuse among female high school students at Adama town, Eastern Ethiopia, 2023

Variable	Response	Number(N)	Percent (%)
Age			
	14–15	59	14.4
	16–17	156	38.0
	18–19	160	39.0
	≥20	35	8.5
	Mean age 17.2+ 1.377 Std. Deviation		
Marital status	Single	368	89.8
	Married	42	10.2
Residence	Urban	316	77.1
	Rural	94	22.9
Living condition	Both parents	270	65.9
	Single parent	80	19.5
	Friends	38	9.3
	Alone	22	5.4
With whom slept together at home	Mother	216	52.7
	Sister/s	71	17.3
	Alone	123	30
Who support for learning	Parents	116	40.5
	Siblings	88	21.5
	Relatives	106	25.9
	Husband/boyfriends	50	12.2
Family sizes	<5	307	74.9
	≥5	103	25.1
Family income	<=3200 birr	35	8.5
	3201-5250 birr	36	8.8
	5251-7800 birr	80	19.5
	>=7801 birr	259	63.2

Substance use among female students

This study identified that female students with substance use status reported that 103 (25.1%) had ever chewed chat previously, 40 (9.8%) were chewing chat currently, 18 (4.4%) were chewing once per week, 45 (11%) had ever drunk alcohol previously, 11 (2.7%) were drinking alcohol currently, and 11 (2.7%) were drinking alcohol once per week (Table 2).

Table 2: Substance utilization status of respondents among high school female students in Adama town, Eastern Ethiopia, 2022

Variable	Response	Number(N)	Percent (%)
Ever chewed Khat	Yes	103	25.1
	No	307	74.9
Chewing khat currently	Yes	40	9.8
	No	370	90.2
Chat chewing frequency	Once in a week	18	4.4
	Twice a week	12	2.9
	Once in a month	10	2.4
Ever drunk alcohol	Yes	45	11
	No	365	89
Drinking alcohol currently	Yes	11	2.7
	No	399	97.3
Alcohol drinking frequency	Once in a week	11	2.7
Friend drink alcohol (chewing) or both	Yes	44	10.7
	No	366	89.3

History of child sexual abuse experiences

The majority of participants (280; 68.3%) reported having ever had a boyfriend, with 66.65% of these having only one boyfriend. Additionally, 261 (63.7%) of the study participants had a history of sexual intercourse. Among those who had sexual intercourse, the most commonly reported consequences were abortion, followed by bleeding, unwanted pregnancies, and sexually transmitted infections (STIs). Regarding the age at first sexual experience, 151 (36.8%) participants reported initiating sexual activity between 14 and 17 years. among those who had ever engaged in sexual intercourse, 124 (47.5%) indicated that their first sexual experience was not based on their will, which constitutes rape. (Table 3).

Table 3: History of child sexual abuse experiences among high school female students in Adama town, Eastern Ethiopia, 2023

Variables		Category	Frequency (n)	Percentage (%)
Have you ever had boyfriend		Yes	280	68.3%
		No	130	31.7%
		Total	410	100.0%
Number of boyfriends ever had in their life		Only one	258	92.1%
		Two or more	22	7.9%
		Total	280	100.0%
Have ever had history of sexual intercourse		Yes	261	63.7%
		No	149	36.3%
		Total	410	100.0%
Was sexual intercourse based on your will(n=261)		Yes	137	52.5%
		No	124	47.5%
		Total	261	100.0%
Have you had any discussion with their parents about SRH		Yes	181	44.1%
		No	229	55.9%
		Total	410	100.0%
Consequences of ever had sexual intercourse	Abortion	Yes	45	17.2%
		No	216	82.8%
	Bleeding	Yes	51	19.5%
		No	210	80.5%
	STI	Yes	56	21.5%
		No	205	78.5%
	Un wanted pregnancy	Yes	89	34.1%
		No	172	65.9%
		Total	261	100.0%

Magnitude of child sexual abuse

This study determined that the magnitude of child sexual abuse among female high school students in Adama town was 32.9% (95% CI 27.9, 37.9) who had experienced child sexual abuse (Figure 2).

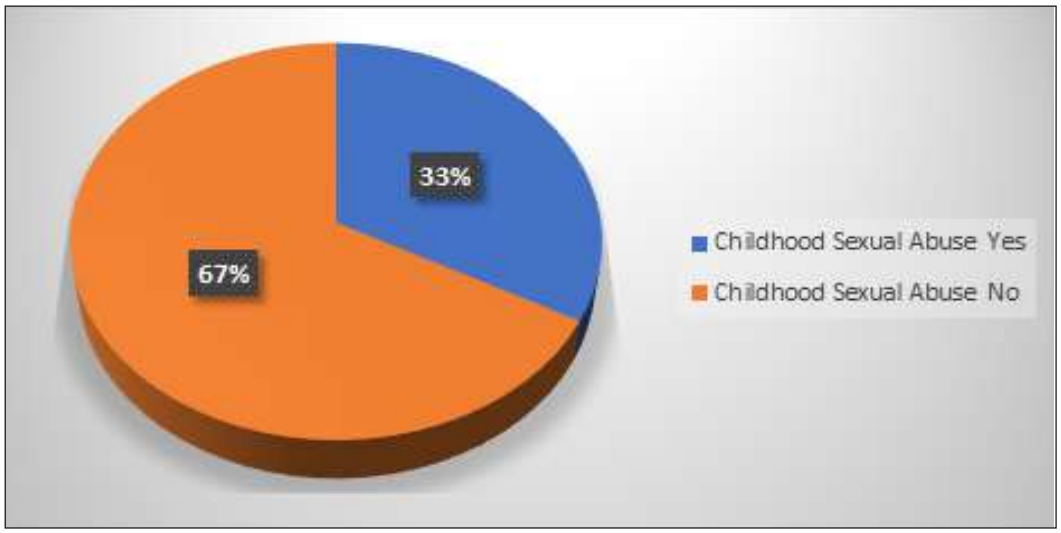

Figure 2: Magnitude of female sexual abuse among female students at Adama Town, 2023

Types of sexual abuse

Of total victims of child sexual abuse, the reported types of sexual abuse revealed that 134 (32.9%) had verbal harassment, 122 (29.8%) had faced touching or body contact harassment, and 79 (19.3%) had child sexual abuse without their consent/rape. Cases involving two or more types are considered overlapping. This study identified that overlapping child sexual child abuse showed that 24.4% overlapped by at least two and 16.3% overlapped by all three types of harassment (Figure 3).

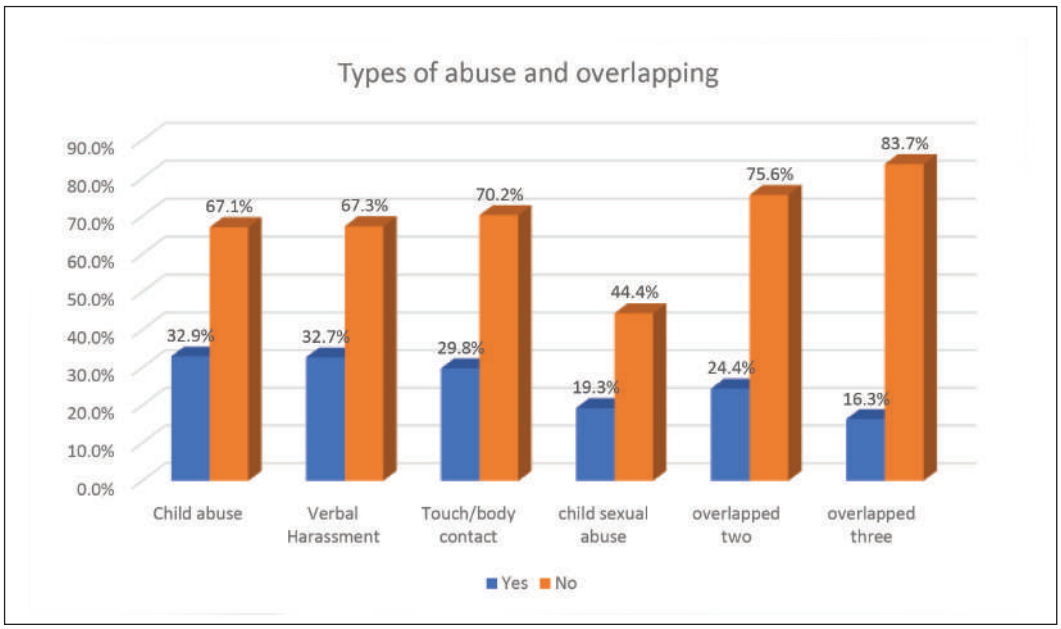

Figure 3: Magnitudes of overlapping and type of sexual abuse among high school female students at Adama, 2023

Factors associated with child sexual abuse among female high school

Binary logistic regression analysis showed that variables like family size, alcohol drinking and chewing chat (both), having a boyfriend, history of sexual intercourse, sexual intercourse based on their will, and having discussions with parents about sexual and reproductive health had a p-value< 0.25 and entered into multivariable logistic regression analysis.

This study revealed several significant predictors of childhood sexual abuse among female students. Those from rural areas were nearly six times more likely to experience childhood sexual abuse compared to their urban counterparts (AOR = 5.87; 95% CI: 1.914–18.02). Female students from larger families, with five or more members, had 2.4 times higher odds of experiencing sexual abuse than those from smaller families (AOR = 2.39; 95% CI: 1.04–5.48). Alcohol use was also associated with increased risk, as students who had ever consumed alcohol were twice as likely to report childhood sexual abuse compared to those who had never drunk alcohol (AOR = 2.24; 95% CI: 1.05–4.74). Additionally, students who had ever initiated sexual activity had 5.5 times higher odds of childhood sexual abuse (AOR = 5.48; 95% CI: 3.21–9.37), and those whose sexual debut occurred without their consent had a markedly elevated risk, with thirteen fold higher odds (AOR = 12.9; 95% CI: 5.24–31.76). Furthermore, lack of communication about sexual and reproductive health with partners increased the likelihood of childhood sexual abuse twofold compared to those who engaged in open discussions (AOR = 1.96; 95% CI: 1.226–3.12). See details in Table 4.

Table 3: Factors associated with child sexual abuse among female high school students at Adama town, Eastern Ethiopia, 2023

Variable	Category	Sexual Abuse		AOR(95%CI	P- value
		Yes	No		
Residence	Urban	111	205	1:00	
	Rural	24	70	5.87(1.914- 18.02)	0.002**
Family size	<5	91	44	1:00	
	≥5	216	59	2.39(1.04- 5.48)	0.039*
Have ever drunk alcohol	Yes	12	33	2.24(1.057- 4.74)	0.035*
	No	123	242	1:00	
History of sexual intercourse	Yes	113	22	5.48(3.21- 9.37)	0.000***
	No	148	127	1:00	
Sexual intercourse based on their will	Yes	35	100	1:00	
	No	115	16	12.9(5.24- 31.76)	0.000***
Discussion with parents about SRH	Yes	46	89	1:00	
	No	135	140	1.96(1.226- 3.12)	0.005**

DISCUSSION

This study assessed the magnitude of child sexual abuse (CSA) and associated factors among female high school students in Adama town, Eastern Ethiopia, in 2023. The prevalence of CSA was found to be 32.9% (95% CI: 27.9–37.9). Although this figure indicates a substantial public health concern, it is lower than the prevalence reported in previous studies conducted in Brazil (41.8%), Addis Ababa (42.7%), and Dire Dawa (48.9%)[5,7,8] . The observed discrepancies may be attributed to several factors, including socio-cultural differences, fear of stigma, and variations in awareness and reporting practices. Urban settings such as Addis Ababa and Dire Dawa, as well as Brazil, are larger metropolitan areas with different social dynamics, which may influence both exposure risk and disclosure patterns.

The prevalence of CSA in this study (32.9%) was higher than the rate reported in Nepal[14]. This variation may be explained by differences in study settings, cultural norms, and methodological approaches. However, the finding is consistent with a study conducted in Butajira, which reported a prevalence of 32.9%[12] suggesting similar risk patterns in comparable to other parts of Ethiopian contexts.

Regarding the types of sexual abuse, the most frequently reported form was verbal harassment, experienced by 32.7% of participants. This aligns with findings from Ethiopia, where verbal harassment accounted for 20.4%, followed by unwanted touch/body contact (20%) and rape (19.1%)[5]. Our results also correspond with studies in Nepal (35.7%)[14], in part of Ethiopia like Bahir Dar (35.8%), and Butajira (32.9%)[15 & 12]. These patterns highlight the persistent burden of CSA across diverse settings and underscore the need for context-specific interventions. Proactively, strategies should focus on school-based awareness programs, confidential reporting mechanisms, and community engagement to address both verbal and physical forms of abuse. Strengthening these measures is essential to reduce CSA prevalence and mitigate its long-term psychological and physical consequences.

Among female students who experienced CSA, the most commonly reported forms were verbal harassment followed by unwanted touching or body contact, and forced vaginal intercourse. Furthermore, this study identified significant overlap among these forms of abuse: 24.4% of victims experienced at least two types, and 16.3% reported all three types of harassment.

These findings are comparable to previous research in Ethiopia, which reported verbal harassment as the most frequent form of CSA (20.4%), followed by unwanted touch (20%) and rape (19.1%)[8]. The higher prevalence of verbal harassment in our study may reflect differences in social norms, communication patterns, and reporting practices in urban settings like Adama town.

This study found that female students from rural areas were six times more likely to experience child sexual abuse compared to those from urban residences. This finding is consistent with previous studies conducted in Bahir Dar and Dire Dawa City[8, 15, 16]. A plausible explanation for this disparity is that students in urban settings generally have better access to information and support services through youth associations, youth centers, mass media, and community programs. These resources promote awareness and open discussion about reproductive and sexual health issues. This lack of exposure and education may increase vulnerability to abuse and reduce opportunities for timely reporting and intervention.

Family size >= 5 increased 2.4 times the odds of sexual abuse as compared to family size less than five in the study area. This finding was supported by study done in Lebanon[17] This suggests that children were victimized by family members, when asked

to specify a perpetrator, they reported unrelated individuals. This may reflect a discrepancy in reporting or reluctance to report family members as perpetrators.

Female students who have ever drunk alcohol have twice times odds of child sexual abuse as compared to those who haven't. This finding is supported by the study done in Bahirdar, and Dire Dawa town, Ethiopia[8, 15]. This could be due to Alcohol can decrease an individual's decision-making capacity regarding their sexual and reproductive health matters.

This finding is consistent with study conducted in Dire Dawa, and Arbaminch town where the odds of experiencing child sexual abuse were much higher among students who never had open discussions with parents on SRH[8, 18]. This leads to missed opportunities for teenagers to acquire experiences and life skills from their parents on how to prevent sexual abuse. These evidences revealed that the importance of parent-adolescent communication about sexual and reproductive health is very crucial as preventive measures.

Participants who had history of child sexual intercourse, those whose sexual intercourse was not depend on their willingness were significantly associated with child sexual abuse. This study was in line with study done Dire Dawa[8], and systematic review and meta-analysis conducted in Ethiopia[19].

Limitations of the Study

This study has several limitations that should be considered when interpreting the findings. First, due to its cross-sectional design and the results are not strong enough to draw cause-and-effect relationships. Second, there is a potential for recall bias, as participants were asked to report past experiences, Third, underreporting of sensitive issues related to sexuality is likely, particularly among out-of-school female adolescents, due to fear of stigma and cultural norms that might have discourage open discussion of sexual matters. These limitations highlight the need for future research using longitudinal designs and strategies to minimize reporting bias.

Conclusions

This study revealed a moderate prevalence of child sexual abuse (CSA) among female high school students in Adama town, Eastern Ethiopia. Key risk factors included rural residence, large family size, and alcohol consumption, history of sexual intercourse, non-consensual sexual experiences, and lack of open communication on sexual and reproductive health issues with parents. The most common forms of CSA were verbal harassment, unwanted body touching, and coerced sexual intercourse, with notable overlap among these types.

Recommendations

To effectively prevent childhood sexual abuse (CSA), the Ministry of Health and the Ministry of Women and Children Affairs should prioritize CSA prevention by integrating targeted awareness campaigns into national adolescent health programs, while strengthening multi-sectoral collaboration among regional health bureaus, NGOs, educational institutions, and community leaders to ensure a coordinated and comprehensive response. School-based health education programs that emphasize CSA prevention, early reporting mechanisms, and help-seeking behaviors should be widely implemented, alongside incorporating CSA awareness sessions into parent–teacher meetings and youth clubs to enhance community-level vigilance. Encouraging open and age-appropriate communication between parents and children on sexual and reproductive health issues is essential to building protective family environments. In addition, promoting community sensitization programs can help reduce stigma, challenge harmful norms, and foster safer spaces for adolescents. To further inform policy and intervention strategies, longitudinal and qualitative studies are recommended to explore the

underlying causes, context-specific risk factors, and long-term consequences of CSA.

Abbreviations and Acronyms

AOR	Adjusted Odds Ratio
AIDS	Acquired Immune Deficiency Syndrome
CSA	Child Sexual Abuse
CI	Confidence interval
COR	Crude Odds Ratio
IRB	Institutional Review Board
HIV	Human Immunodeficiency Virus
NGO	Non-Governmental Organization
WHO	World Health Organization

Declarations

Ethics approval and consent to participate

The study obtained ethical approval from the Santé Medical College Research and Publication Committee (Ref. No. SM/03/1719/15) and was conducted with official support from the Adama Education Bureau. Participants and their families were informed about the study's purpose, provided consent and assent, and were assured of their right to withdraw or refuse participation at any time. Confidentiality and privacy were strictly maintained throughout the research process, with all data and records securely stored.

Consent to publish: Not applicable

Availability of data and materials: Datasets used in the current study are available from the corresponding author upon reasonable request.

Competing interests: Authors declared that they have no competing interest

Funding: Funding for this study was obtained from Santé Medical College's. The college had no role in the design of the study and collection, analysis, and interpretation of data.

Author Contributions

KJ & DBD, contributed to the conception, design, and conduct of the study, analyzed and interpreted the data, and prepared the manuscript contributed to the conception, design, and conduct of the study, analyzed and interpreted the data, and prepared the manuscript DBD & KJ contributed to the design and conduct of the study, analyzed and interpreted the data, and prepared the manuscript. All authors read and approved the final manuscript.

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PREVALENCE AND FACTORS ASSOCIATED WITH OUTCOME OF LABOUR INDUCTION: PROSPECTIVE LONGITUDINAL STUDY AT A TERTIARY HOSPITAL IN KAMPALA, UGANDA

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ABSTRACT

INTRODUCTION: The purpose of the study was to determine the prevalence of, outcome and factors associated with successful induction of labour.

METHODS: A prospective longitudinal study was conducted at a tertiary non-profit teaching hospital in Kampala, Uganda from January to August 2023. A total of 300 pregnant women who underwent induction of labour [IOL] were included in the study. Data was collected from the participants and admission records using a pre-designed questionnaire. Data analysis was done using STATA/SE 12.0 statistical software. The primary outcome measure was the prevalence of IOL and the outcome of IOL as successful or failed induction and the secondary outcomes included mode of delivery, maternal/neonatal complications and factors associated with successful IOL. The association between the different factors and successful IOL was determined using bivariate and multivariable logistic regression analyses. A p-value less than 0.05 was set as a cut off for statistical significance

RESULTS: The prevalence of IOL was 16.5% [±1.7] [300/1815]. Successful IOL occurred in 63% [±5.5] [189/300] while 21% [±4.6] [62/300] had failed induction. The remaining 16% [±4.2] [49/300] had caesarean section [C/S] delivery due to other obstetric indications within 24 hours and before entry into active labour. A favourable Modified Bishop's score [6-13] at start of induction was associated with 100% (37/37) success. The following non cervical factors were positively associated with successful IOL: Normal BMI [aOR=4.0, CI=1.1-13.8], parity≥1 [aOR=7.7,CI=2.1-28.0], prolonged latent labour as an indication [aOR=7.7,CI=2.1-28.0], postdates/post-term as an indication for induction [aOR=3.0,CI=1.3-6.9], emergency induction [aOR=2.7,CI=1.4- 5.4] and attending at least 4 antenatal care visits [aOR=2.6,CI=1.0-6.8]. Starting the IOL with intact amniotic membranes was negatively associated with successful IOL [aOR=0.1, CI=0.0-1.0].

CONCLUSION: IOL is fairly successful intervention in our setting. Favourable Modified Bishop's score is a good indicator for successful IOL. In presence of appropriate indications, IOL should be encouraged as the success rates are comparable to those in other settings.

KEY WORDS Induction of labour, active labour, failed induction, successful induction, associated factors, Uganda.

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BACKGROUND

Induction of labour [IOL] is defined as artificial initiation of labour after age of viability for the purpose of achieving vaginal delivery when the benefits of delivery to the baby and/or mother outweigh that of continuing with the pregnancy[1]. Although the definition of IOL is universally accepted, the definition for the outcome of IOL as either successful or failed is still controversia[12]. Majority of studies have defined successful IOL as vaginal delivery and failed induction as caesarean delivery[3–5].Some authors defined successful IOL as ability to enter into active labour within 24 hours after initiation of IOL and failed induction as the inability to do so[6,7]. Labour progress after achieving active labour is influenced by many other factors just as occurs in spontaneous labours and that failed vaginally delivery may be due to other obstetric factors not related to IOL process[8].

The trends of IOL have been increasing steadily over the last decades with worldwide prevalence at about 20% of all deliveries[9]. The rates are variable in the high income countries [9-33%][10] with low- and middle- income countries[LMICs] having the lowest prevalence [1.4-6.8%][11–13]. In Sub Saharan Africa the true prevalence is not well described due to lack of large multicentre studies and uniform health information indicators on induction of labour[14–17].

The outcome of IOL as either successful or failed is also varied[18–23]. In Uganda, studies on labour induction prevalence are limited. IOL should generally be done when there is a proper indication. Induction of labour has been shown to be an intervention that reduces perinatal morbidity and mortality when done for the proper indication and following the proper technique compared to expectant management especially after 41 completed weeks of pregnancy[24–28]. The outcome of labour induction has been shown to be varied depending on various predictors like indication; method used for induction; foetal factors; maternal factors; labour factors[29–31]. Methods of IOL are broadly classified into mechanical and pharmacological. No method is uniformly superior to the other and the choice depends on clinical scenario with factors like prior uterine surgery, status of cervix, foetal living status, cost and availability of required agents affecting decision making[32]. The commonly used prostaglandins include PGE1 and PGF2. Compared to other prostaglandins, misoprostol, a synthetic prostaglandin E1 is preferred in resource poor countries because it is stable at room temperature, relatively inexpensive and can be given via several routes namely oral, vaginal, sublingual, and buccal, making it an ideal agent for IOL, particularly in Sub-Saharan Africa[33].

Maternal and neonatal outcomes from various methods of labour induction have shown variable results on rates of caesarean section, uterine hyper stimulation and neonatal asphyxia[34].

METHODS

Study Design

This study was a prospective longitudinal study.

Study Setting

St Francis Hospital Nsambya, a private, tertiary care, teaching and referral hospital located in the southern part of Kampala, the capital city of Uganda.

Study Population

The study included 300 pregnant women underwent induction of labour during the study period. Consecutive sampling was used until the sample size, obtained by Fisher's formula for prevalence, was reached.

Study period

The study was conducted from January 2023 to August 2023

Inclusion criteria

Women of sound mind aged at least 18 years with singleton pregnancy in cephalic presentation and gestational age of at least 28weeks of amenorrhea by either 1st trimester scan or by Last Menstrual Period [LMP] dating.

Exclusion criteria
We excluded those with unknown gestational age, on induction of labour that was started at a different facility or transferred during the follow up process.

Primary outcomes: Prevalence of labour induction, Successful induction of labour & failed induction of labour.

Secondary outcome measures: Mode of delivery, Apgar score of new born, Admission to new born unit.

Study procedure
Participants were identified through inquiry from midwives on duty and by checking in the admission records. Participants were guided through the study information chart and informed consent note by the Principal Investigator [PI] or research assistant. All Participants signed two written consent notes witnessed by a member of the research team. One copy remained with the participant while the other copy was attached to the questionnaire. Data were collected using questionnaires by the PI or one of the research assistants which captured the required data and supplemented it with clinical records from the patient's medical file.
The baseline cervical state assessment by the modified Bishop's score was documented at the initial examination of the patient. A score of 6 or less was used as a threshold to classify an "unfavourable" cervix while a score of more than 6 was classified as "favourable" cervix. Participants were followed for 24 hours post-initiation of labour induction and until delivery to monitor induction progress, time to active labour, mode of delivery, and immediate perinatal outcomes.

OPERATIONAL DEFINITION OF TERMS

Successful induction of labour:
Ability to achieve cervical dilatation of 5 cm or more within 24 hours of prostaglandin administration and/or 12hours of oxytocin administration with artificial rupture of membranes as soon as feasible and safe[8].

Failed induction of labour:
Defined as inability to achieve cervical dilatation of 5 cm or more within 24 hours of prostaglandin administration and/or 12hours of oxytocin administration with artificial rupture of membranes as soon as feasible and safe[8].

Hyper stimulation:
Over activity of the uterus as a result of IOL. It can be defined as >5contractions per 10 minutes.

Cycle of induction of labour:
A cycle of IOL refers to the prescribed dosage of the agent (or agents if dual method is used) which includes the dose (amount administered at a time), the frequency and the number of doses over a specified period of time that constitutes one complete treatment.

Induction of labour:
Induction of labour is defined as the process of artificially stimulating the uterus to contract to initiate labour after the age of viability when the benefits of delivery to the baby and/or mother outweigh that of continuing with the pregnancy (1).

Data Analysis
Data analysis was done using STATA/SE 12.0 statistical software. Data were presented in pie charts and tables. Categorical data were summarized using frequency tables while continuous variables were summarized using summary statistics. A Chi-square test was used in testing association of categorical variables to the outcome while continuous data were compared with unpaired student's t-test. The prevalence of Induction of labour was determined by the number of pregnant women induced of labour divided by the total number of pregnant women who delivered during the study period. Dependent variables included: Incidence of labour induction; primary outcomes of IOL: successful induction of labour & failed induction of labour; secondary outcomes of IOL: maternal and neonatal outcomes [e.g. mode of delivery, maternal complications,

Apgar score of new born, Admission to new born unit]. Independent variables included: maternal sociodemographic factors: age, BMI, residence, religion, marital status, education level, occupation; obstetric factors: parity, previous history of IOL, number of ANC visits, cervical status, status of membrane; IOL process: indication, type of IOL, method used; foetal factors: Birthweight, gestational age.

Predictors for successful IOL were determined using modified Poisson regression in bivariate analysis to crudely measure the strength of association between the different factors followed by adjustment in multivariable logistic regression. A p-value less than 0.05 was considered to be statistically significant at multivariate regression. Odds ratio was used as the measure of strength of association.

Ethical considerations

Clearance for the study was given by St Francis Hospital Nsambya administration and Ethical approval obtained from St Francis Hospital Research and Ethics Committee [SFHN-2022-68]. Written informed consent was obtained voluntarily from all participants. Confidentiality of all information collected from the participants was ensured by using anonymous participant's numbers and removing all personal identifiers.

RESULTS

Social demographic characteristics

The ages of participants ranged from 16 to 43 years with mean age of 29±5.3 years. Only 15% [46/300] of the participants had normal Body Mass Index (BMI). Among the study participants, majority were married [93.7%], lived in urban areas [92%] and were employed [73.3%]. At least half of the participants had tertiary level of education. Approximately half of the mothers were multiparous.

Table 1: Participants' socio-demographic variables

Characteristic	N = 300
Age [years], mean [SD]	29.3 [±5.3]
Age [complete years], n [%]	
≤19	4 [1.3]
20-34	238 [79.4]
≥35	58 [19.3]
Weight [kgs], mean [SD]	77.5 [13.3]
Weight [kgs], n [%]	
<90	247 [82.3]
≥90	53 [17.7]
Height [cm], mean [SD]	159.8 [±6.4]
Height [cm], n [%]	
≥150	291 [97.0]
<150	9 [3.0]
BMI [kgs/m2], mean [SD]	30.4 [5.1]
BMI [kgs/m2], n [%]	
Normal [18.5-24.9]	46 [15.3]
Overweight [25-29.9]	103 [34.4]
Obese [≥30]	151 [50.3]
Residence, n [%]	
Urban	276 [92.0]
Rural	24 [8.0]
Religion, n [%]	
Christian	248 [82.7]
Muslim	39 [13.0]
Others	13 [4.4]
Marital status, n [%]	
Married	281 [93.7]
Single	12 [4.0]
Cohabiting	7 [2.3]
Education level, n [%]	
Primary	8 [2.7]
Ordinary secondary	63 [21.0]
Advanced secondary	63 [21.0]
Tertiary	163 [54.3]
Not specified	3 [1.0]
Occupation, n [%]	
Student	8 [2.7]
Housewife	57 [19.0]
Self-employed	75 [25.0]
Salaried/wage	145 [48.3]
Not specified	15 [5.0]
Gravidity, mean [SD]	2.6 [1.8]
Gravidity, n [%]	
1	115 [38.3]
≥2	185 [61.7]
Parity, mean [SD]	1.2 [1.5]
Parity, n [%]	
0	148 [49.3]
1-4	144 [48.0]
≥5	8 [2.7]

SD= Standard Deviation
Others refer to other minority religious groups like orthodox, Hindu, traditional religious practices.

Pregnancy and induction of labour characteristics

The mean gestational age of the participants was 39.3 [±1.9] weeks. All the participants attended antenatal care from various facilities with 82% having attended the recommended 4-8 visits by the time of IOL. Approximately 65.7% were emergency inductions. The commonest indication for IOL was postdates/post term pregnancy. Approximately 10% had favourable modified Bishop's score and oral misoprostol was the most common drug.

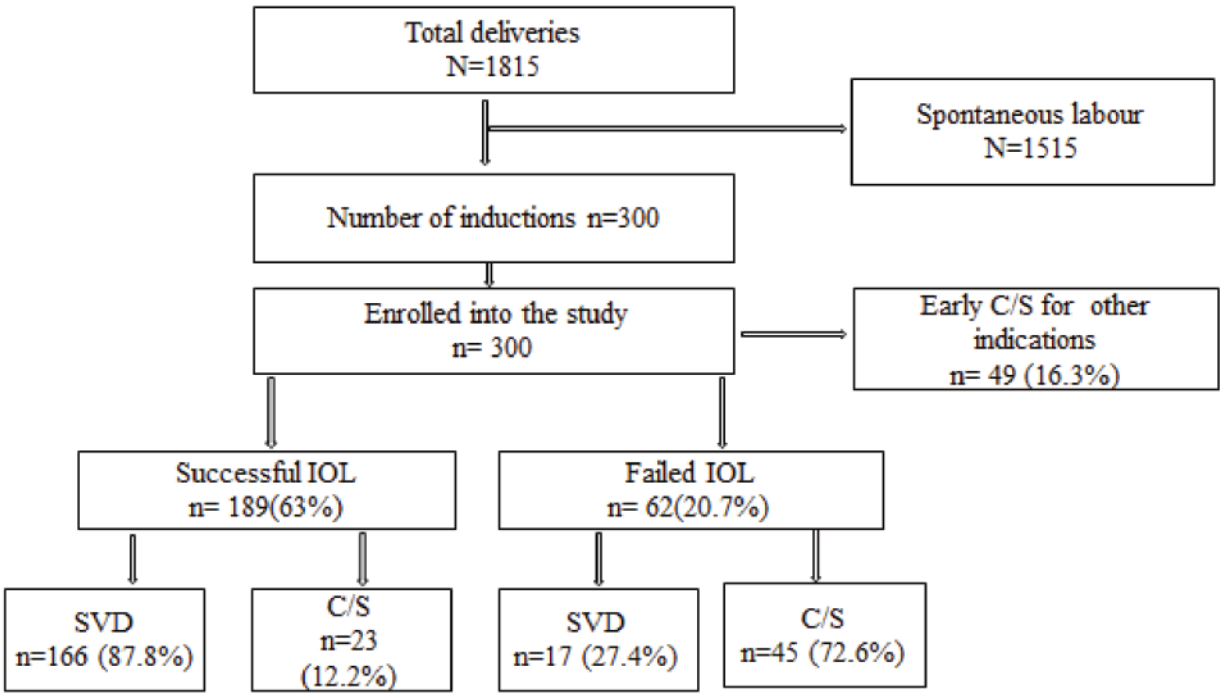
Table 2: Pregnancy and induction of labour variables

Gestational age [WOA], mean [SD]	39.3 [±1.9]
Gestational age [completed WOA], n [%]	
28-34[preterm]	5 [1.7]
35-36 [late preterm]	8 [2.7]
37-40[term]	193 [64.3]
≥41[postdates/post term]	94 [31.3]
No. of ANC visits attended, mean [SD]	5.4 [± 1.8]
No. Of ANC visits attended, n [%]	
4-8	246 [82.0]
<4	53 [17.7]
>8	1 [0.3]
Previous IOL history, n [%]	
No	242 [80.7]
Yes	40 [13.3]
Not specified	18 [6.0]
Indication for IOL, n [%]	
PROM/PPROM	19 [6.3]
Post term/postdates	104 [34.7]
Hypertensive disease	45 [15.0]
Oligohydramnios	5 [1.7]
Foetal factors[e.g. NRFS, congenital anomalies, IUFD, poor BPP]	14 [4.7]
Prolonged latent labour	67 [22.3]
Other	46 [15.3]
Type of IOL, n [%]	
Emergency IOL	197 [65.7]
Elective IOL	103 [34.3]
Status of membrane at start of IOL, n [%]	
Intact	265 [88.3]
Ruptured	32 [10.7]
Not indicated	3 [1.0]
Bishop's score at start of IOL, n [%]	
6-13 [favourable]	41 [13.7]
0-5 [unfavourable]	259 [86.3]
Method of IOL, n [%]	
Oral misoprostol	279 [93.0]
Vaginal prostaglandins [Vaginal misoprostol/ Dinoprostone vaginal]	2 [0.7]
Intravenous Oxytocin	15 [5.0]
Mechanical [Balloon catheter/Amniotomy + Oxytocin]	4 [1.3]
Time of starting IOL, n[%]	
Day 263 [87.7]	
Night	37 [12.3]
Duration [complete hrs] of induction	
≤24hours of prostaglandins	182 [60.7]
>24 hours of prostaglandins	62 [20.7]
<12 hours of oxytocin and amniotomy	7 [2.3]
Cannot be assessed [C/S due to other/ alternative indication]	49 [16.3]

WOA = Weeks of Amenorrhea. ANC = Antenatal Care. PPROM = preterm pre-labour rupture of membrane. PROM = Pre-labour rupture of membranes. NRFS = Non-reassuring foetal status. IUFD = intra-uterine foetal demise. BPP = Biophysical profile.

Prevalence of labour induction

During the study period there were a total of 1815 deliveries. A total of 300 women underwent IOL. The prevalence of IOL was 16.5% [300/1815].



A figure showing the overview of participants flow through the study

SVD = spontaneous vaginal delivery.

Primary outcome of labour induction

Successful IOL occurred in 63% [189/300] of the participants. The prevalence of failed induction was 21% [62/300]. Among the participants, 16% [49/300] had caesarean section delivery due to other obstetric indications within 24 hours and before entry into active labour.

Maternal and Neonatal Secondary outcomes

Maternal peripartum complications occurred in 13.7% [41/300] of the participants with the most common being postpartum haemorrhage [PPH]. There was one maternal death due to PPH. Majority of the babies were born alive and more than 80% [260/300] had normal birth weight. Approximately 32% [95/300] of the newborns were admitted to newborn unit for further care.

Table 3: Primary and Secondary maternal and neonatal outcomes of IOL

Characteristic	
Primary outcomes, n [%]	
Successful	189 [63.0]
Failed	62 [20.7]
C/S due to other/alternative indication	49 [16.3]
Maternal Secondary outcomes, n [%]	
Maternal complication of IOL: NO	259[86.3]
Maternal Complication of IOL: YES	41[13.7]
-APH	4[1.3]
- PPH	24[8]
-Hyper stimulation	13[4.3]
Mode of delivery, n [%]	
Vaginal	183 [61.0]
Caesarean section [c/s]	117 [39.0]
Time of delivery, n [%]	
Day	183 [61.0]
Night	117 [39.0]
Neonatal Secondary outcomes	
Life status at delivery, n [%]	
Alive	295 [98.3]
MSB	5 [1.7]
Birth weight of new-born [kgs], mean [SD]	3.3 [±0.6]
Birth weight of new-born [kgs], n [%]	
2.5-3.9 [normal]	260 [86.7]
<2.5 [LBW]	16 [5.3]
≥4.0 [Macrosomia]	24 [8.0]
APGAR score	
1st minute, mean[SD]	8.2 [1.42]
1st minute, n [%]	
>5	293[97.7]
0-5	7[2.3]
5th minute, mean[SD]	**9.4 [1.4]**
5th minute, n [%]	
>5	**293 [97.7]**
0-5	**7 [2.3]**
Admission to New-born Unit [NNU], n [%]	
No	205 [68.3]
Yes	95 [31.7]

APH = ante-partum haemorrhage. MSB = macerated stillbirth.
LBW = low birthweight.

Factors associated with successful induction of labour

While controlling for gestational age and type of induction, attending ≥4 antenatal care visits was 2.6 times [aOR=2.6, CI=1.0-6.8] more likely to result in successful labour induction than attending less than 4 antenatal care visits. Normal BMI at start of induction was 4 times [aOR=4.0, CI=1.1-13.8] more likely to result in successful induction than being overweight or obese. Parity of ≥1 was 8 times [aOR=7.7, CI=2.1-28.0] more likely to be successful compared to parity of 0. Having indication for induction of labour as prolonged latent labour and post term/postdates was 8 times [aOR=7.7, CI=2.1-28.0] and 3 times [aOR=3.0, CI=1.3-6.9] more likely to lead to successful induction respectively. Participants who had emergency IOL were 2.7 [aOR=2.7, CI=1.4-5.4] times more likely to have successful induction than their counterpart in the elective inductions. Women with intact amniotic membranes at start of induction were 88% [aOR=0.1, CI=0.0-0.1] less likely to have successful induction compared to those with ruptured amniotic membranes.

Table 4: Multivariate analysis of factors associated with successful IOL

Characteristic	Successful IOL	Failed IOL	aOR	95% CI	p-value
Weight [kgs], n [%]					
<90	158 [77.5]	46 [22.5]	2.1	0.7, 6.3	0.2
≥90	31 [66]	16 [34]			
Height [cm], n [%]					
≥150	186 [76.2]	58 [23.8]	2.4	0.4, 13.1	0.3
<150	3 [42.9]	4 [57.1]			
BMI [kgs/m2], n [%]					
Normal [18.5-24.9]	29 [90.6]	3 [9.4]	4.0	1.1, 13.8	0.0
Overweight/obese [≥25]	160 [73.1]	59 [26.9]			
Gravidity, n [%]					
1	125 [78.3]	36[21.7]	0.6	0.2, 2.1	0.4
≥2	64 [71.1]	26 [28.9]			
Parity, n [%]					
1-4	116 [83.5]	23 [16.5]	7.7	2.1, 28.0	0.0
0	73 [65.2]	39 [34.8]			
ANC attended, n [%]					
≥4	158 [77.5]	46[22.5]	2.6	1.0, 6.8	0.0
<4	31 [66]	16 [34]			
Indication for IOL, n [%]					
Hypertensive disease	18 [52.9]	16 [47.1]	0.6	0.3, 1.5	0.3
Prolonged latent labour	56[94.9]	3 [5.1]	7.7	2.1, 28.0	0.0
Post term/postdates	69[77.5]	20[22.5]	3.0	1.3, 6.9	0.0
Type of IOL, n [%]					
Emergency	130 [80.7]	31 [19.3]	2.7	1.4, 5.4	0.0
Elective	59 [65.6]	31 [34.4]			
State of membrane, n [%]					
Intact	160 [73.1]	59 [26.9]	0.1	0.0, 1.0	0.0
Ruptured	28[96.6]	1[3.4]			
Time of starting IOL, n [%]					
Day	165[73.3]	60[26.7]	0.1	0.0, 0.9	0.0
Night	24[92.3]	2[7.7]			

aOR = adjusted Odds Ratio

DISCUSSION

The prevalence of IOL was 16.5%. This prevalence is lower than the estimated worldwide prevalence of 20% (9) but higher than that reported in LMICs of 1.4-6. This could be accounted for by the setting, a tertiary teaching and referral hospital, in the capital city and having an obstetrician on duty all the time. These factors were found to increase the prevalence of IOL in a previous multicentre study by WHO in LMICs[11].

Successful IOL occurred in 63% of the mothers on IOL. This was almost similar to the findings of study done within East Africa in DR Congo by Tandu-Umba et al in 2013 which showed successful induction prevalence of 66%[14]. The prevalence is however lower than that of other studies done in similar settings including 76% in Uganda[22], 74% in Kenya[20] and 71% in Tanzania[21].Failed induction was about 21%. This prevalence was comparable to that of 22% found in a study at Mbarara Regional referral hospital in western Uganda by Kajabwangu et al in 2019[35].Varied results of failed IOL ranging from 21% to 50% have been recorded[35–37]. This difference is expected due to the heterogeneity in defining successful and failed induction in different studies.

Out of the mothers who underwent IOL, majority [61%] had vaginal delivery. This is in keeping with the other studies which showed similar prevalence of vaginal deliveries among induced pregnancies, 71% in Tanzania[21], 66% in Congo[14] and 76% in Uganda[22]. It should also be noted that 87.2% of those with successful induction were delivered vaginally with about 12% undergoing caesarean deliveries. This underscores the need to separate the mode of delivery from the outcome of induction as either successful or failed induction, as the progress of labour to vaginal delivery can be influenced by other factors even after achieving successful induction. The most commonly [93%] used drug for IOL was oral misoprostol. This is probable due to the dual advantages that misoprostol has over other prostaglandins in LMICs of low cost and heat stability.

Maternal peripartum complications occurred in 13.7% of the participants with the most common being postpartum haemorrhage [PPH]. One death occurred due to refractory PPH secondary to uterine atony while another participant had uterine rupture. A similar incidence of maternal death following induction of labour due to refractory PPH was reported in 2020 by Lueth et al. in a study in Ethiopia[3]. These complications were noted to be more common among high risk mothers like those with multiparity[13].

Favourable modified Bishop's score [score of 6-13] was associated with 100% [37/37] success in this study. Similar findings of positive association were found in other studies[29–31]. The use of prostaglandins for cervical ripening and IOL has been recommended by WHO to increase the chances of success in unfavourable cervix[38].

This study has explored a number of non-cervical factors associated with successful IOL. Compared to mothers with Overweight/obese, mothers with normal BMI were 4 times more likely to have successful IOL [aOR4.0, CI=1.1-13.8]. The weight and height in our study was however, taken at the beginning of IOL. This has been documented in other studies with similar findings[11,29]. Mothers with parity ≥1 were more likely to have successful IOL than nulliparous women [aOR=7.7, CI=2.1-28.0]. This was also positively associated with successful IOL in others studies in our setting[22,35]. This could be due to presence of previously primed oxytocin and prostaglandins receptors which can easily be reactivated unlike in nulliparous women. Emergency induction was positively associated with having a successful IOL when compared to elective induction [aOR=2.7, CI=1.4-5.4]. This outcome is comparable to a study done in western Uganda which had similar findings[35]. Pregnant women who attended at least 4 ANC visits were

2.6 times [p=0.046] more likely to have successful IOL compared to their counterpart who attended less than 4 visits. These results are similar to those of a WHO multicentre study in LMICs[11]. Intact amniotic membrane status at start of induction was negatively associated with successful IOL [aOR=0.1, CI=0.0-1.0]. This could be due to decreased release of prostaglandins when amniotic membrane is intact as documented elsewhere[29].

Strengths and limitations of this study

This study used entry into active labour as the measure for successful IOL thus excluding the confounders of vaginal delivery. This study was single centred and had limited follow up time hence long term outcomes could not be documented.

CONCLUSION

The prevalence of IOL was 16.5%. This was higher than the recorded average for LMICs. Based on the previously recorded high level of unmet need for IOL in LMICs, this prevalence is an improvement. Favourable Modified Bishop's score is a good indicator for successful IOL. Our success rates for IOL are comparable to other settings in the globe.

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APPROPRIATE ANTENATAL COUNSELING QUESTIONS FOR PREGNANT WOMEN WITH FETAL CONGENITAL ANOMALIES AT SELECTED HOSPITALS IN ADDIS ABABA: CLIENTS' AND COUNSELORS' PERSPECTIVES

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ABSTRACT

BACKGROUND: Congenital anomalies, errors in fetal development, can be devastating for expectant parents. Effective counseling on congenital anomalies requires scientific and empathetic methods tailored to sociocultural, educational, and religious aspects of a society. It is crucial to address both counselors' and clients' concerns, yet a standard tool suited to our society's unique needs is lacking. Therefore, this study aims to assess counseling components derived from an internationally validated tool, emphasizing the perspectives of both clients and counselors, with the goal of establishing a standard for counseling pregnant women with fetal congenital anomalies in our setting.

OBJECTIVE: To evaluate clients' and counselors' perspectives on appropriate antenatal counselling questions for pregnant women with fetal congenital anomalies in Ethiopia.

METHODS: A facility based mixed convergent parallel cross-sectional study, conducted in three high volume hospitals in Addis Ababa, Ethiopia. Eight clients for the qualitative and 251 counselors for the quantitative were included in the study. Counselors had graded each question from an internationally validated QUOTE prenatal (The quality of care through the patient's eyes) questionnaire in a 1 to 4 scale based on their judgment as to the relevance of each question in the context of our clients. Clients also had undergone an in-depth interview about the components of the questionnaire to check for its applicability. Descriptive statistics, Cronbach's coefficient alpha reliability analysis and face validity tests were used for quantitative data and thematic analysis was done for the qualitative data and findings were merged.

RESULT: The response rate was 88%, Cronbach's alpha was 0.914 making all of the questions reliable. From the 38 questions, 32 were labeled as valid by the counselors and we identified three themes: (1) Questions from the tool which are asked and got understood by the clients, (2) Questions which are asked but was not clear for the clients and (3) Questions which are not asked to the clients at all. Questions which were valid by the counselors were also well understood by the clients.

CONCLUSION: Most of the counseling questions from QUOTE prenatal questionnaire were found to be appropriate for use in Ethiopian setting by counselors. Additionally, the questions considered important were also well understood by the clients.

KEYWORDS: Antenatal counseling, QUOTE prenatal, congenital anomaly, Ethiopia

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INTRODUCTION

Congenital anomalies, which is an error in fetal development, occurs in 2% to 4% of live births, and affect 7.9 million children worldwide, with a significant proportion detected before birth by routine ultrasound and other screening techniques. Prenatal diagnosis of a congenital anomaly can have significant emotional and psychological consequences for parents of affected babies.[1- 8, 9–12]

Given the psychological stress and uncertainty associated with a prenatal diagnosis, parents should be given prenatal counselling which is an interactive process between a client and a counselor during which information is exchanged and support is provided so that an informed decision can be made and an appropriate action could be undertaken.[1–8]

It should be a two-way communication between a counselor and a client which should be unbiased and respectful of the client's choice, culture, religion and beliefs. Information transfer must be made in a clear and neutral way, using simple language so that it can contribute to the autonomous informed decision making of the client.[1–8]

Full information relevant to their fetus's congenital anomaly, causes, management options, birth outcomes, and short and long-term impacts should be delivered. It should be delivered in an order of flow.[8]

It has to start with the basics of the counseling which is client-counselor relation, then a health education about the anomaly has to be delivered and a support has to be given to reach to the final decision.[8, 10, 13–15]

Counseling on congenital anomaly in Ethiopia is still in its infancy stage because the procedures that counselors employs seems by large what the counselor assumes is better in assisting their clients even if they did not follow specific procedures and the approach is not acknowledging the different cultural diversities of our society. On the client side it is known that Ethiopian patient perceptions regarding causes of congenital anomalies is reported to be on beliefs in supernatural, natural, and societal causes as the reason of the anomaly. This demands a counseling service highly respecting the cultural and religious values of our society.[9, 11]

The lack of guidelines for counseling is set as a significant barrier for counseling service delivery. In most cases, counselors said that they had to set their own standards and they obtained knowledge through trial and error, as well as by consulting other professionals, given the absence of counseling guidelines.[10, 12–14]

So far among the very few, there is one internationally validated and widely used tool since 2011 for counseling of parents having a fetus with congenital anomaly- the quality of care through the patients eyes, QUOTE prenatal questionnaire.[8, 10, 13–15]

Direct use of different counseling tools developed and applied in another set up, like the QUOTE prenatal questionnaire, without customization to the practical livelihood of our society will not be effective in full filling the core values of the counseling. While the capacity to diagnose congenital anomalies is increasing throughout Ethiopia, so far there is no standard tool regarding counseling of pregnant mothers on fetal congenital anomalies which is tailored to our society's educational, cultural, social, religious and economic background in our country.[9,10,12,15]

And this paper will contribute by providing a standard tool for counseling of pregnant ladies with fetal congenital anomaly, which has a scientific ground, taking into consideration of our cultural and religious values and which is assessed from both the counselors' and clients' perspective for its practical applicability. Hence, the aim of the study is to assess clients' and counselors' perspectives on appropriate antenatal counselling questions for pregnant women with fetal congenital anomalies among clients and counselors in Ethiopia.

MATERIALS AND METHODS

Study Design

The study is a facility based mixed convergent parallel cross-sectional study used to assess clients' and counselors' perspectives on appropriate antenatal counselling questions for pregnant women with fetal congenital anomalies among clients and counselors in Ethiopia.

Study Setting and Period

The study was conducted in Addis Ababa, Ethiopia from May 1 to December 31, 2024, in three high volume teaching hospitals (Abebech Gobena MCH center, Black lion referral hospital and St Paul hospital millennium medical college) which are serving as a referral center to all corners of the country. The hospitals are equipped with the different diagnostic modalities, inpatient-outpatient services, different departments and subspecialty units with an average delivery of around 900 per month. All the three of them has been serving as a teaching hospital for undergraduate, post graduate and subspecialty programs, with more than 264 obstetrics and gynecology residents of all levels and more than 82 obstetrics and gynecology specialists, fellows and subspecialists.

Study Population

For quantitative component: The quantitative component of the study was conducted by counselors. Counselors in this study are all obstetrics and gynecology residents, specialists, fellows and subspecialists who are educated representatives of the community who still value the culture, religious value and norm of the society they represent.

For qualitative component: The qualitative component was conducted among pregnant women with fetal congenital anomalies attending antenatal care at selected hospitals. Participants were volunteer clients who had received counseling and completed management, were not in labor or undergoing pregnancy termination, and were not critically ill.

Sampling methods

For the quantitative sample, since the number of counselors is less than the result from the single population formula sample size with P value of 50% which is 384, all counselors were involved and a final of 251 counselors have conducted the research.

For the qualitative study, considering the homogenous nature of the clients and to avoid redundancy, the interview was conducted among eight clients.

Data Collection

The quality of care through the patient's eyes, QUOTE prenatal, questionnaire was used as a self-administered questioner and counselors were grading each question in a 1 to 4 scale based on their judgment as to the relevance of each question in the context of religious, sociocultural, educational and economic background of our clients. From the different listed questions, each question was subjected to the counsellor and he/she was requested to level it as 1= not important, 2= fairly important, 3= important and 4 = very important.

For the qualitative part an in-depth interview were conducted for 15minutes among pregnant mothers with fetal congenital anomalies by a trained female data collectors.

Data processing and analysis

The quantitative data were cleaned and coded using SPSS version 29. Descriptive analysis was done to describe study characteristics. Scale reliability analysis was conducted to assess the reliability of the components of the questions, using Cronbach's coefficient alpha value >0.7 as reliable. Face validity test was used to check the validity of tools. The collected qualitative data were transcribed, themed and narrated. Results were presented using texts, tables and central tendency statistics.

Operational definition

- Counselor's perspective of appropriate counseling question are those questions which are labeled as "important" or "very important" by >75 % of the counselors. (15)
- Client's perspective of appropriate counseling questions are those questions which the client understands and gives clear answers without confusion.[15]
- Reliable and valid questions for quantitative result are those questions which have passed Cronbach's alpha and face validity tests respectively.

Ethical consideration:

Ethical approval is obtained from institutional Review board with IRB number RPO/45/16 on 24/7/24 and participants were provided with the information that their participation was on voluntary basis and an informed consent and consent of publication was obtained from each participant. The information collected from this research project was kept confidential and personal identifiers were avoided.

RESULTS

Quantitative Study

Among 251 counselors who participated in the study, the majority were males (205, 81.7%) and orthodox Christian (143,57%) (Table 1). and Obstetrics and gynecology residents (207,82%). More than two third of the counselors(208,83%) had no previous training in counselling regarding congenital anomaly.

Table 1: Socio demographic characteristics of participants (counselors)

Counselors gender	**Total n** (%)
male	205 (82)
female	46 (18)
Professional level	
year one residents	59 (29)
year two residents	45 (22)
year three residents	48 (23)
year four residents	55 (27)
residents	207 (82)
specialist	15 (6)
fellow	18 (7)
subspecialist	11 (4)
Religion	
orthodox	143 (57)
Muslim	33 (13)
protestant	34 (14)
other	31 (12)
catholic	9 (3.6)
no religion	1 (0.4)
Have you taken any course or a session on counseling	
yes	43 (17)
no	208 (83)
total	251

The QUOTE prenatal questionnaire has two parts – three component questions (client-counselor relationship, provision of health education and decision making support) and detailed questions under the three component questions.

Regarding the counselor's response on the components of the questions, client-counselor relationship, provision of health education and decision making support was valid as important or very important by more than 90% of the counselors (Table 2)

Table 2 Counselors' response on the components of the questioner

client counselor relationship	frequency	percent
not important	0	0
fairly important	12	4.8
important	70	27.9
very important	169	67.3
total	251	100.0
provision of health education		
not important	1	0.4
fairly important	11	4.4
important	66	26.3
very important	173	68.9
total	251	100.0
decision-making support		
not important	4	1.6
fairly important	12	4.8
important	58	23.1
very important	177	70.5
total	251	100.0

Under the content of client – counselor relation, only one questions "asking about previous congenital anomalies" was labeled as not appropriate by the counselors (mentioned as important or very important only by 71.3% of counselors) (Table 3).

From the content of health education, five questions was labeled as not appropriate by the counselors (Table 4) (labeled as important or very important by <75% of the counselors).

Within the content of decision making support all the questions were labeled as appropriate by our counselors (Table 3).

Reliability test

Reliability was assessed for each components of the question separately and for the overall 38 items using Cronbach's alpha (Table 3),

Face validity test

All the questions were assessed by the counselors. Based on this assessment; six questions from the QUOTE Prenatal Questionnaire were excluded from counseling for pregnant women in our setting due to sociocultural and religious considerations. The remaining 32 questions were selected for use by counselors during client counseling

Qualitative Study

Of the eight pregnant women with fetal congenital anomaly, the mean age is 27.5 ± 5 years (21- 35 years).only two of them have first degree, all are married and five of them are orthodox religion followers (Table 3).

Table 3: Socio demographic characteristics of clients

list	age	religion	marital status	occupation	level of education	parity	income (per month)
C1	35	orthodox	married	teacher	1 St degree	3	20000-25000
C2	24	Muslim	married	house wife	grade 5	1	unknown
C3	22	protestant	married	cleaner	grade 7	1	unknown
C4	21	orthodox	married	house wife	grade 12	0	unknown
C5	30	orthodox	married	cleaner	grade 12	2	unknown
C6	29	protestant	married	cashier	1 St degree	1	10203
C7	28	orthodox	married	day laborer	grade 10	2	12000
C8	33	orthodox	married	self employed	10+2	0	30000

We generated three significant themes to illustrate which of the QUOTE prenatal questions can be easily understood by our clients, the themes are discussed, with representative quotes in (table 8A,8B,8C).

From the clients and counselors perspective the final counseling tool for pregnant ladies with fetal congenital anomaly would be seen in Table 4.

Table 4 Final validated counseling tool

	Client–counselor relation
1	Give the client enough time to explain herself properly
2	Put the client at ease or comfortable
3	Take client's concerns seriously
4	Show empathy
5	Use clear and comprehensible language
6	Ask about what the client knows about congenital anomaly before the beginning of the counseling
7	Take adequate time to answer all of client's questions
8	Giving the client the option of (additional) written information or picture aid
9	Add culturally competent educational Film
10	Make it clear that the client can ask anything she wants to know
11	Tell the client that she can always contact you with any questions that she might have
12	Accept client's decisions
13	Give the option of having two or more counselling /discussion sessions instead of only one counselling session
14	Explain client's possible emotional reaction phases
	health education
1	Have an adequate discussion about topics that the client considers to be important
2	Explain about how a birth defect will affect the child in the future
3	Explain how having a child with congenital anomaly would affect the client and the whole family
4	Explain how long the client should take to decide whether or not to terminate the pregnancy with congenital abnormality
5	Explain about how much prenatal tests cost
	decision-making support
1	Ask the client what she knew about the specific congenital anomaly before the start of the session
2	Enquire client's standards, values and views
3	Ask about client's background on religion
4	Ask the client if she wants, her partner/ any one that she prefers, to be with her during the counselling
5	Encourage the client and her partner/ any one that she prefers, to talk together about the anomaly
6	Discuss about how the client or her family would react to a child with a birth defect
7	Ask whether client's family, friends or other people close to her would support her decision
8	Ask "what a healthy child is for her "
9	Ask about which anomalies are acceptable to the client
10	Explain the exact congenital anomaly
11	Explain about the possible causes of the anomaly
12	Explain for clients about all possible options of management for the anomaly
13	Support the client to make decision

The study found that, among the QUOTE Prenatal Counseling questions, counselors excluded eight items as unsuitable for counseling women with fetal congenital anomalies, and the items considered important by counselors were also clearly understood by clients.

DISCUSSION

Counseling for congenital anomalies in Ethiopia remains underdeveloped, with counselors primarily employing subjective approaches in the absence of standardized procedures and with limited consideration of the country's cultural diversity.

On the client side it is known that Ethiopian patient perceptions regarding causes of congenital anomalies is reported to be on beliefs in supernatural, natural, and societal causes. This demands a counseling service highly respecting the cultural and religious values of our society.[9, 11]

It is highly recommended to establish an objective method for evaluating counseling quality through the use of a validated instrument.

Direct use of different counseling tools developed and applied in another set up, like the QUOTE prenatal questionnaire, without customization to the practical livelihood of our society will not be effective in full filling the core values of the counseling.[10, 12–14]

In our study client counselor relation, health education, decision making support and enquiring client's standards, values and views were chosen to be important and very important by more than 92% of our counselors and all of the clients have mentioned it as very important part of the counseling which is in line with several similar researches.[1, 3, 5, 10, 14–16, 20, 24, 30]

Similar to previous studies, regarding providing clients with written information or pictorial aids, 94.4% of our counselors rated it as important or very important. Additionally, half of our clients reported that pictorial explanations of the anomaly were provided during counseling, which facilitated better understanding.[8, 15, 16, 27]

Consistent with other studies asking about what the client knows about the anomaly before the beginning of the counselling and asking what a healthy child is for the client was labeled as important or very important by 76.1% & 87% of our counselors.[15, 16, 23]

Encouraging the client and her partner to talk together about the anomaly and asking about client's background on religion was valid by 94% & 75% respectively of our counselors similar to previous researches mentioning that clients preferred to get advice about how to discuss the tests with their spouse at home. All of the clients and 98.4% of counselors has chosen the question using clear and comprehensible language to be valid.[3, 5, 8, 14, 16, 21, 30]

Giving the option of having two or more counselling /discussion sessions instead of only one counselling session and adding culturally competent educational film was valid by 88.8% of our counselors and this result is consistent with different research results.[1, 15–17, 26]

Earlier studies have reported similar findings regarding asking clients whether they would like their partner or another preferred person to be present during counseling, as this is an effective way to help relieve stress.[1, 14, 15, 21, 26]

Having an adequate discussion about topics that the client considers to be important, prenatal tests cost and telling the client that she can always contact the counselor with any questions that she might have are mentioned as important or very important by 81% & 93% of the counselors which is reported same by previous works.[1, 14, 15 16, 21, 30]

Putting the client at ease or comfortable was chosen by 97.2% of our counselors as it is also supported by the WHO counseling guide and Midwives' views on appropriate antenatal counselling for congenital anomaly tests.[1, 15]

Explaining about the types and importance of all prenatal screening in general was labeled as important or very important by only 60% of our counselors and all of our clients were not able to

understand the question properly, this is in contrary to the research on midwives' views in Netherland which was rated as important by 98.1% of their counselors and also by a research done in Morocco. This could be explained by the fact that its only very few screening modality that we have as a country and mentioning those which won't be available will not be as such important to the client.[6, 15, 16]

Asking about previous congenital anomalies and asking about client's family history of birth defects was valued only by 71.3% and 60.5% respectively of our counselors in contrast to the Netherland's study which was 89.7% for both and this could potentially be explained by the fact that our clients usually considers that most of the congenital anomalies are because of supernatural power and religious related so they tend not to reveal to anyone else. And another explanation could be even the definition of healthy child is different for different client and the question could be a vague one and sometimes the clients won't even remember it properly. [1, 8, 9, 16, 25, 26]

Explaining which anomalies would be identified with prenatal screening and explaining why the client may or may not be eligible for certain prenatal tests was valued as important or very important only by 56.% and 57.8% respectively of our counselors as opposed to 96.7% and 86.7% respectively in the midwives views research. the other question of explaining about how often congenital anomalies occur in pregnant women of clients age which is valued by 60.2% of counselors in our case was in contrary of 70% by the above study, this could be taking our clients educational background into consideration and explaining the congenital anomaly types and the screening types may not match to our clients educational background.[6, 15, 22]

CONCLUSIONS

This study indicated that most of the counseling questions were found to be appropriate for use in Ethiopian setting except for questions about the previous history of congenital anomaly, various perinatal screening tests, eligibility criteria and family history of congenital anomalies which are deemed less important by our counselors and clients. Additionally the questions considered important by counselors were also well understood by the clients.

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Availability of data

The data analyzed during the study are available with the corresponding author on request with the e mail address- melatseb@yahoo.com

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DETERMINANTS OF MATERNAL MORTALITY AMONG WOMEN WITH ECLAMPSIA MANAGED AT THE IGNACE DEEN NATIONAL HOSPITAL, CONAKRY, GUINEA

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ABSTRACT

BACKGROUND: Maternal mortality, is a fundamental indicator of maternal health and it is a major public health problem in developing countries . Approximately 830 women die every day worldwide from complications related to pregnancy or childbirth Eclampsia, a serious complication of pre-eclampsia, is a major cause of maternal death globally, particularly in low-income countries where its incidence remains high. The objective of this study was to determine factors associated with maternal deaths among eclamptic patients at the Ignace Deen National Hospital in Conakry.

METHODOLOGY: This was a 4-years retrospective study conducted at the Ignace Deen National Hospital in Conakry, among eclamptic patients. Data were collected using a structured data collection form and analyzed with SPSS 26.0. Binary and multivariable logistic regression were employed assess the association of explanatory variables with the outcome variable. a 95% confidence interval (CI) and a threshold value of $p < 0.05$ wrer used for determining statistical significance

RESULTS: A total of 99 eclamptic patients were included in this study. The maternal mortality rate was 20.2%. After logistic regression, the factors significantly associated with maternal death in eclamptic women were the absence of prenatal care (AOR: 11.92; CI: 1.15–123.45), a Glasgow coma scale between 3 and 6 (AOR: 37.83; CI: 37.83–256.92), the delay in accessing healthcare (AOR: 7.07; CI: 1.07–46.63), and status eclampticus (AOR: 6.33; CI: 1.29–31.09).

CONCLUSION: This study highlights the importance of strengthening access to antenatal care and improving e timely and effective management of eclamptic patients, particularly by reducing transfer times to specialized care facilities. Such actions could contribute to the reduction of maternal mortality related to eclampsia in this context.

KEYWORDS: associated factors, maternal deaths, eclampsia, Guinea.

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INTRODUCTION

Maternal mortality is a major public health issue worldwide. According to the World Health Organization (WHO), it is defined as the death of a woman during pregnancy or within 42 days of the end of pregnancy, regardless of the duration or location of the pregnancy, resulting from a cause related to or aggravated by the pregnancy or by the care it provided, excluding accidental or fortuitous causes[1].

About 260, 000 women died during and following pregnancy and childbirth in 2023[2]. Approximately 92% of all maternal deaths occurred in low- and lower-middle-income countries in 2023, and most could have been prevented[3]. In Guinea, the maternal mortality ratio was 553 per 100,000 live births in 2020[4].

In most developed countries, maternal mortality associated with eclampsia has been minimized. In two studies conducted in the United Kingdom and France, no deaths were recorded among eclamptic patients[5,6]. However, eclampsia remains a leading cause of maternal mortality in developing countries, where its incidence remains high[7]. This severe complication of vascular -renal disorders of pregnancy is manifested by tonic-clonic seizures and/or alterations of consciousness, linked to preeclampsia, without a pre-existing neurological pathology being able to explain its origin[8,9]. Eclampsia was associated with a maternal mortality rate of 8.5% in Abuja (Nigeria), 10.7% in Benin City (Nigeria) and 35% in Dakar (Senegal)[10-12].

Factors contributing to maternal deaths due to eclampsia include a Glasgow score ≤ 8 at admission, vaginal delivery, and the occurrence of more than two seizures, as reported in the literature[13]. Reducing maternal lethality due to eclampsia requires accurate identification of risk factors in affected patients.. Such information could help reduce the rate of maternal deaths due to eclampsia by optimizing management strategies within our health structures.

Several studies have been carried out on the determinants of maternal deaths in the study hopsital but none to our knowledge have focused on the factors associated with maternal deaths in eclamptic patients. The objective of this study was to determine factors associated with maternal deaths among eclamptic patients admitted to the obstetrics and Gynecology department at the Ignace Deen National Hospital in Conakry.

METHODOLOGY

Study setting

The Ignace Deen National Hospital, located in the Kaloum district in the heart of the capital city of Conakry, is a level III facility in the country's healthcare system. Together with the Donka National Hospital, it forms the Conakry University Hospital Center (CHU). The study was conducted at the obstetrics and gynecology department of this hospital For the past nine years, it has been the only functioning level III referral center for maternal health, care handling obstetric emergencies from Conakry and some surrounding prefectures. The estimated annual number of deliveries has increased from 3,000 to 8,000 in the past 9yrs.

Study Design

This was a retrospective study with an analytical component .

Study Period

The study was conducted over a four-year period, from June 1, 2020 to May 30, 2024.

Study Population

All Patients with eclampsia who were managed at the department during the study period. Eclampsia was diagnosed in patients who developed convulsive seizures in the peripartum period without a history or clinical signs of another seizure etiology.

Inclusion Criteria: all eclamptic patients who died or were discharged alive, who were treated in the department during the study period, with medical records containing complete data.

Exclusion Criteria: eclamptic patients with records containing missing data and mortuary records of deaths occurring due to eclampsia.

Data Collection

Data collection was carried out through review of the records of eclamptic patients treated in the department during the study period followed by their transcription onto the data collection form. The sample size was 99 eclamptic patients meeting the selection criteria defined above.

Study Variables

Dependent Variable: maternal death following hospitalization.

Independent Variables: These included sociodemographic characteristics, obstetric and clinical profile of the patients, management approach, and the fetal state at birth (alive/dead).

Operational Definitions

The delay in accessing healthcare: we defined as a period exceeding 24 hours between the onset of the first symptoms and hospital admission.

The the 3rd delay (delay in initiating treatment): defined as any period exceeding one hour between the diagnosis of eclampsia and the start of curative treatment.

Maternal Death: it is defined as the death of a woman during pregnancy or within 42 days of the end of pregnancy, regardless of the duration or location of the pregnancy, resulting from a cause related to or aggravated by the pregnancy or by the care it provided, excluding accidental or fortuitous causes.

The Galscow Coma Scale: The Glasgow Coma Scale is a standardized medical tool for assessing a person's level of consciousness, ranging from 3 (deep coma) to 15 (full consciousness), based on three responses: eye opening, verbal response, and motor response.

Classification and interpretation of the Glasgow Coma Scale

15: Normal consciousness

14-10: Drowsiness or mild coma

9-7: Moderate to severe coma

6-3: Deep coma (3 is the lowest score, corresponding to an absence of response).

Eclamptic Patients: An eclamptic patient is a pregnant (or postpartum) woman presenting with sudden-onset generalized tonic-clonic seizures and or/coma after ruling out other causes associated with signs of preeclampsia.

Status Eclampticus: This is a serious neurological emergency characterized by the occurrence of tonic-clonic eclamptic seizures that last abnormally long (more than 5 minutes) or follow one another without recovery of consciousness, leading to continuous cerebral hyperactivity.

Data Management and Analysis

SPSS 26.0 software was used for coding, data entry, cleaning, and analysis. Outliers, duplicates, and missing values were addressed. Maternal case fatality was calculated as the proportion of maternal deaths of deaths among all eclamptic patients during the study period. Descriptive and binary logistic regression analyses were performed, and a p-value < 0.05 in multivariate logistic regression was considered statistically significant with a 95% confidence interval (CI).

Ethical Considerations

Permission from the head of department and the institutional ethics committee (Ignace Deen National Hospital) was obtained before data collection began. Confidentiality and anonymity were Assured.This study was approved by the National Ethics Review Committee in Guinea (approval number 218/CNERS/23).

RESULTS

During the study period, 26,304 births were recorded in the department, including 135 cases of eclamptic patients, among those 36 eclamptic patients were excluded from the study due to insufficient information in the files and others for being admitted without signs of life (death confirmed before or during admission). Ninety-nine (99) eclamptic patients met the inclusion criteria, including 20 patients who died during hospitalization.

Mortality in eclamptic patients: we recorded 20 cases of maternal death out of the 99 eclamptic patients included, representing a mortality rate of 20.20%.

The sociodemographic characteristics and obstetric profile of patients with eclampsia were marked by a median age of 23 years (range: 15–45 years), with a predominance of patients in the 20–29 age group (46.5%). The majority of patients were married (92.9%), had no formal education (43.4%), and were admitted from another hospital (83.8%). Obstetric history showed a predominance of primiparous women (55.6%), and 89.9% of patients had received 1 to 4 prenatal consultations (ANC) (Table 1).

Table 1: Sociodemographic characteristics and obstetric history of eclamptics treated at the gynecology-obstetrics department of the Ignace Deen National Hospital, Conakry University Hospital from June 1, 2020 to May 30, 2024 (n=99)

Variables	Frequency	Percentage
Sociodemographic characteristics		
Age (in years)		
≤ 19	27	27.3
20-29	46	46.5
30-39	23	23.2
≥ 40	3	3.0
Median age = 23 years; Extremes: 15 and 45 years		
Occupation		
Housewife	30	30.3
Student	18	18.2
Liberal	41	41.4
Employee	10	10.1
Marital status		
Bachelor	7	7.1
Bride	92	92.9
Level of education		
Not in school	43	43.4
Primary	20	20.2
Secondary	23	23.2
Superior	13	13.1
Admission mode		
Came from another hospital	83	83.8
Coming from home	16	16.2
Obstetric history		
Gravidity		
Primigravida	55	55.6
Multigravida	44	44.4
Parity		
Nulliparous	9	9.1
Primiparous	55	55.6
Multiparous	35	35.3
Number of prenatal consultations		
0	9	9.1
1-4	90	90.9

Clinical, therapeutic and prognostic characteristics of eclamptics patients

Clinically, a delay in consultation (2nd delay) was observed in 10.1% of patients. Systolic blood pressure (SBP ≥ 160 mmHg) and diastolic blood

pressure (DBP ≥ 110 mmHg) values were recorded in 73.7% and 56.6% of cases, respectively. Neurological status assessment at admission revealed that a Glasgow coma scale between 3 and 6 was present in 10.1% of patients. The antepartum and antepartum periods were the most frequent for the occurrence of eclampsia (51.5%) (Table 2).

Regarding before the transfer and hospitalization management, 67.5% of patients did not receive magnesium sulfate before evacuation, and a delay in management (3rd delay) was observed in 12.1% of cases. More than 91.9% of patients gave birth, including 58.7% by cesarean section, with 94.4% under general anesthesia. During hospitalization, 90.9% of patients received magnesium sulfate according to the WHO protocol. Eclamptic coma was recorded in 7 patients (7.1%) with a stillbirth rate of 13% (Table 2).

Table 2: Clinical, therapeutic and characteristics of eclamptics treated in the gynecology-obstetrics department of the Ignace Deen National Hospital, Conakry University Hospital from June 1, 2020 to May 30, 2024 (n=99)

Variables	Frequency	Percentage
Clinical features		
Delay in accessing healthcare		
Yes	10	10.1
No	89	89.9
SBP ≥160mmHg		
Yes	73	73.7
No	26	26.3
DBP ≥110mmHg		
Yes	56	56.6
No	43	43.4
Galscow Coma Scale		
Real to1 15	24	24.3
14-10	53	53.5
9-7	10	10.1
6-3	12	12.1
Time of onset of eclampsia		
Antepartum	51	51.5
Intrapartum	22	22.2
Postpartum	26	26.3
Therapeutic characteristics		
Administration of magnesium sulfate before evacuation		
Yes	27	32.5
No	56	67.5
3rd delay		
Yes	12	12.1
No	87	87.9
Childbirth		
Yes	92	92.9
No	7	7.1
Mode of delivery		
Vaginal delivery	38	41.3
Cesarean section	54	58.7
Type of anesthesia		
General anesthesia	51	94.4
Loco-regional anesthesia	3	5.6
Administration of magnesium sulfate on arrival		
Yes	90	90.9
No	9	9.1
Predictions		
Newborn condition		
Alive	80	87.0
Stillborn	12	13.0
Status eclampticus		
Yes	7	7.1
No	92	92.9
Acute renal failure		
Yes	1	1.0
No	98	99.0

Factors associated with maternal death in eclamptic patients

Bivariate analysis revealed that some factors were significantly associated with an increased risk of maternal death in eclamptic patients ($p < 0.05$). These factors included employment status, absence of antenatal consultations, delay in consultation (delay in accessing healthcare), Glasgow score between 3 and 6, delay in care (3rd delay) and the presence of status eclampticus (Table 3).

After fitting the above variables into in multivariable regression analysis , not having completed the prenatal consultation (aOR : 11.92; CI: 1.15-123.45), having a Glasgow score between 3 and 6 (aOR : 37.83; CI: 37.83-256.92), the delay in accessing healthcare (aOR : 7.07; CI: 1.07-46.63)

and status eclampticus (aOR : 6.33; CI: 1.29-31.09) were statistically significantly associated factors with the occurrence of maternal deaths in eclamptic patients (Table 3).

Table 3: Factors associated with maternal death in eclamptic patients treated at the gynecology-obstetrics department of the Ignace Deen National Hospital, Conakry University Hospital from June 1, 2020 to May 30, 2024 (n=99)

Variables	Maternal deaths in eclamptics		COR (95% CI)	AOR (95% CI)	P value for AOR
	Yes	No			
Occupation					
Student	6	12	1	1	
Liberal	4	37	0.28 (0.08-0.92)	4.47 (0.64-31.17)	0.13
Housewife	4	26	0.51 (0.15-1.67)	5.36 (0.59–48.12)	0.13
Employee	6	4	8.03 (2.00-32.19)	0.26 (0.03-2.15)	0.21
Marital status					
Bride	18	74	0.60 (0.11-3.39)	1.19 (0.05-24.59)	0.90
Bachelor	2	5	1	1	
Admission mode					
Came from another hospital	18	65	1.93 (0.40-9.32)	0.06 (0.01-2.25)	0.13
Coming from home	2	14	1	1	
Lack of prenatal consultation					
Yes	6	3	10.85 (2.42-48.58)	11.92 (1.15-123.45)	0.03
No	14	76	1	1	
SBP ≥160mmHg					
Yes	16	57	1.54 (0.46-5.13)	4.54 (0.40-51.29)	0.22
No	4	22	1	1	
DBP≥110mmHg					
Yes	15	41	2.78 (0.92-8.38)	0.35 (0.05-2.20)	0.26
No	5	38	1	1	
Mode of delivery (n=92)					
Cesarean section	6	48	0.55 (0.17-1.80)	0.71 (0.14-3.54)	0.68
Vaginal delivery	7	31	1	1	
3rd delay					
Yes	6	6	5.21 (1.46-18.52)	2.82 (0.45-17.67)	0.26
No	14	73	1	1	
Glasgow score (10-14)					
Yes	6	47	0.29 (0.10-0.83)	1.91 (0.36-10.11)	0.44
No	14	32	1	1	
Glasgow Score between 3 and 6					
Yes	10	2	38.5 (7.35-201.47)	37.83 (37.83-256.92)	0.00
No	10	77	1	1	
Administration of magnesium sulfate on arrival					
Yes	14	76	0.09 (0.02-0.41)	0.10 (0.01-0.87)	0.03
No	6	3	1	1	
Delay in accessing healthcare					
Yes	5	5	4.93 (1.26-19.18)	7.07 (1.07-46.63)	0.04
No	15	74	1	1	
Status eclampticus					
Yes	4	3	6.33 (1.29-31.09)	6.33 (1.29-31.09)	0.02
No	16	76	1	1	

DISCUSSION

In this study, we analyzed the factors associated with maternal deaths in eclamptic patients treated at the obstetrics-gynecology department of the Ignace Deen National Hospital, between June 2020 and May 2024.

This study reveals that maternal case fatality was not negligible in this group of patients, with two(2) eclamptic women dying out of 10. Maternal case fatality related to eclampsia of 19.4%, 20% and 22.3% have been reported in different regions of Nigeria[15-17]. A lower maternal lethality rate was recorded in a secondary data analysis of 10 low and medium resource geographic regions, at 6.9%[18]. In high-income countries, maternal death rates among eclamptic women remain lower[17]. This result could be explained by the late arrival of some eclamptic patients, often in a state of multiple complications (eclamptic status, eclamptic coma, renal failure, etc.). differences in the level of advancement in maternal health care provision, including infrastructure, medical equipment, and human resource capacity.
The study revealed that the absence of prenatal consultations was associated with the occurrence of maternal deaths in eclamptics. Adamu AN and al. had found in their series that patients who had not had a prenatal consultation were more likely to die from eclampsia and its complications.[20]. Harioly Nirina and al. reported in their study of maternal deaths in eclamptic women in Antananarivo that patients who had fewer than 4 antenatal visits had a 40-fold risk of dying compared to other eclamptic patients[21]. For MacKay AP and al., women who had not received any antenatal consultation had a higher risk of dying from preeclampsia or eclampsia than those who had received any antenatal consultation[22]. This situation could be explained by a lack of prenatal consultations. Pregnant women may therefore miss the opportunity to receive appropriate advice on the symptoms and warning signs of preeclampsia and eclampsia, thus increasing the risk of eclampsia and its complications, including maternal death. This lack of antenatal consultations, although the study was conducted in an urban setting, constitutes a major public health problem. Strengthening awareness-raising actions among pregnant women on the benefits of prenatal consultations could help to reduce the risk of certain pregnancy-related complications and ensure early treatment when they occur.

This study revealed that eclamptic patients admitted in a state of deep coma were at greater risk of dying than other eclamptics. Rakotomboahangy TM and al. and Small MJ and al. had found in their series, respectively, that the comatose state multiplied by 208 and 10 times the risk of maternal death in eclamptic patients[23,24]. This observation could be explained, on the one hand, by the insufficiency of resources for optimal management of eclamptic patients in a comatose state admitted to the department, and on the other hand, by the very limited capacity of the intensive care unit, leading to delays in the transfer of these patients to this department. These delays can contribute to the deterioration of their clinical condition. Despite their comatose state, some patients remain in the department for several days, with occasional assistance from the intensive care unit. The management of comatose eclamptic patients is a major challenge, compromising their vital prognosis. Improving the conditions for managing comatose eclamptic patients in our department, as well as increasing the capacity of the intensive care unit, could significantly improve their vital prognosis.

The study revealed that delay in consultation was associated with death in eclamptic patients. In Nigeria, some authors reported that a consultation delay of 12 hours or more after the onset of seizures increased the risk of maternal death in eclamptics by 104 times[15]. Delay in seeking medical advice has also been reported by some authors in Nigeria and Bangladesh as a factor associated with the occurrence of death among eclamptic patients[25,26]. This implication of delay in consultation in the occurrence of maternal deaths in eclamptics could

be explained on the one hand, by the fact that in our context in most cases, eclampsia occurs at home or during transport exposing patients to repeated tonic -clinical seizures that can cause significant cerebral suffering before arrival in the department and on the other hand, the absence of medical transport and difficult access to the study site for some patients coming from the upper suburbs and greater Conakry. Delay in consultation thus constitutes a factor aggravating the vital prognosis of eclamptic patients. These results highlight the importance of rapid transfer of patients at the onset of prodromal signs or at the onset of crises, as well as appropriate management upon admission to improve the chances of survival.

Strength and limitations of the Study

The limitations of this study lie mainly in its retrospective nature, which may introduce selection bias. However, this study has the potential to provide valuable information on the management of eclamptic patients, as it was carried out in a level III maternity hospital, which receives the majority of obstetric emergencies in the region. This specificity gives the study a particular representativeness and clinical relevance for the analysis of the most serious cases, thus offering perspectives on the needs and challenges of the management of obstetric complications in this context.

CONCLUSION AND RECOMMENDATIONS

This study showed that the absence of antenatal consultations, a Glasgow score between 3 and 6, delay in access to care and status eclampticus are factors significantly associated with an increased risk of maternal death. These data highlight the importance of strengthening access to antenatal care and improving the timely and effective management of eclamptic patients, particularly through reducing referral delays to specialized care facilities.

Conflicts of interest

The authors declare no conflicts of interest related to this work.

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Authors' contributions

Sow AII (design, data collection and analysis, and manuscript writing) Kolie D and Castro GH (data analysis and manuscript writing) , Bah OH and Diallo FB (manuscript review), Diallo IT (data collection), Diallo A (manuscript review), Toure A (manuscript review), Balde IS (manuscript review), Sy T (manuscript review).

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List of abbreviations

ANC: Antenatal Consultations
AOR: Adjusted Odds Ratio
CI: Confidence Interval
COR: Crude Ratio Odds Ratio
DBP: Diastolic Blood Pressure
MMHg: Millimeter of Mercury
SBP: Systolic blood pressure
SPSS: Statistical Package for the Social Sciences
UHC: University Hospital Center
WHO: World Health Organization

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AGE AT NATURAL MENOPAUSE AND ITS ASSOCIATED FACTORS AMONG WOMEN IN ADDIS ABABA, ETHIOPIA

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ABSTRACT

BACKGROUND: Menopause is the permanent cessation of menstruation. Women tend to live one third of their life during the postmenopausal period. The timing of natural menopause varies genetically, ethnically, and geographically.

OBJECTIVES: The aim of the study was to determine the timing of menopause and prevalence of associated symptoms and explore the existing gap in health needs of postmenopausal women.

METHODS: A cross-sectional study was conducted from February to March 2024 at College of Health Sciences among 408 eligible women. A pretested standardized questionnaire was used to collect data from eligible postmenopausal women of ages 30-60 years. Data was analyzed using SPSS version 25.

RESULT: The mean age of the study participants was 51.78 ± 5.43 years. The mean age of menopause was 45.05 (±4.65) years. Premature menopause was reported in 10.0% of the women. Only 1.5% had late menopause (≥55 yrs) while 47.3% (193) had menopause at ages 45-49 years and 12.5% at age of 50-54 years. Hot flushes was the commonest peri-menoausal symptom experienced by 202 (49.5 %) of the participants. Night sweating 199 (48.8%), mood change 147 (36.0%), history of peri-menoausal weight gain 158 (38.7%) and sleep disturbance 128 (31.4%) were among the other symptoms reported by participants. Multiparity (AOR= 3.4, 95%CI=1.138-9.796) and previous implant contraception use (AOR= 2.05, 95%CI=1.033-4.058) were significantly associated with age at menopause of 45 yrs.

CONCLUSION: The mean age of natural menopause in our study (45.05 years) was lower compared to many reports from developing countries and other local studies. However the prevalence of pre mature menopause (10.0%) was higher than most prior reports. Hot flush was the commonest menopausal symptom. Parity and use of Implants were significantly associated with age at menopause of ≥ 45yrs.

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INTRODUCTION

Menopause is the permanent cessation of menstruation.It is an important milestone in women signaling the end of a woman's reproductive life. Women live about one third of their life during thepostmenopausal period.The population of women in the post menopausal age is growing globally as a result of population-wide increases in life expectancy.[1, 2]

The timing of natural menopause varies in different populations affected by genetics, ethnicity, and geographic location. The median age at natural menopause is currently approximately 51 years.[1, 3] The reported ages of natural menopause in Europe, North America, Latin America and Asia were 50.1-52.8 years, 50.5- 51.[4], 43.8-53, and 42.1-49.[5] respectively.[4] Studies from Ethiopia reported that the age of menopause ranged from 46 to 49 years.[5, 6]

Menopause has impact on different body functional systems including the genitourinary, musculoskeletal and endocrine systems.[3, 7, 8] Early menopause has been associated with increased risks of cardiovascular disease and osteoporosis, while late menopause has been associated with increased risks of breast, endometrial and ovarian cancers.[9-11]

Age at menopause is an important marker of population health as increasing age of menopause by one year is associated with reduction of mortality by 2% .[12]

Menopause associated symptoms are common and has a negative impact on the wellbeing of individuals. The prevalence of menopausal symptoms is high, reported by 40 to 87% of postmenopausal women.[7, 13] Early symptoms of menopause include commonly autonomic symptoms and menstrual disorders whereas late symptoms are related to genitourinary, musculoskeletal and cardio vascular symptoms.[8, 14, 15] The symptoms and their severity differ from women to women as a result of different factors including BMI, lifestyle, economic status and level of education.[7]

Menopausal symptoms, particularly the vasomotor and sexual dysfunction, affect quality of life.[7] Menopause is also highly associated with poor reproductive health quality of life, emotional instability, decreased cognitive ability (fogging) and repetitive vasomotor symptoms in addition musculoskeletal and sexual dysfunction. These outcomes may, in turn, result in poor work performance and social activity, particularly in those who withearly menopause.

Many factors affecting the age of menopause have been reported. These factors include genetic, obesity, substance use, social levels, cigarette smoking, BMI, ethnicity, education, nutrition and supplements, menarche age, oral contraceptive use, parity, region, and country.[4, 8, 12, 15-18] Age of menopause is lower in developing countries compared to industrialized nations which has a great impact on early morbidity and mortality of women due to a progressive decline in estrogen secretion.[19]

In our society; losing a mother is traumatic as she is the corner stone of the family. The few studies conducted in Ethiopia reported that the age of menopause was very low compared to other African studies.[5] Hence, identifying factors associated with menopausal ageisimportant to decrease menopause related health risks.

In order to plan for early diagnosis and management of various complications, understanding the age at menopause and changes associated with menopause is crucial.There are very limited published studies in Ethiopia on menopause. Hence, the aim of this study was to determine the age of menopause and associated factors among Ethiopian women at three hospitals.

METHOD AND MATERIALS

Study Design and Setting: This is a cross-sectional descriptive study conducted from February to March 2024. Data was collected from patient attendants and patient visitors from Gandhi Memorial Hospital (GMH), Zewditu Memorial Hospital (ZMH), Tikur Anbesa Specialized Hospital (TASH) and ALERT Specialized Hospital with equal proportion. These hospitals are referral hospitals treating patients mostly from all corners of Addis Ababa and the surrounding areas.

Study population: All eligible patients' attendants and visitors in the four hospitals between ages 30 to 60 years who were in the post menopausal period during the study period were included. Women who had primary amenorrhea, taking hormonal contraceptives, currently pregnant or lactating, and had hysterectomy or bilateral oophorectomy were excluded. Those participants identified to have health issues related to perimenopause were linked to Gynecologic OPDs for further evaluation and management.

Sample size determination: The sample size was determined using a single population proportion formula and by considering the prevalence of menopausal hot flush 65.9 % in a previous study.13 Adding 15% non-response rate the total sample size calculated was 397 participants. A total of 408 participants who had complete interview records were included in the study.

Data collection and study tools: Data was collected using a standardized pretested questionnaire which was adapted from prior similar study reports and organized based on the study objectives.[3, 4, 8, 13, 14, 20, 21] Data collected included socio-demographic variables (age, marital status, residence, educational level, religion, ethnicity, occupation, economic status, estimated average monthly family income, life style and habits (smoking, alcohol, coffee, diet)), reproductive variables (age of menarche, age at first delivery, parity, contraceptive use, sexual dysfunction, unilateral oophorectomy, menstrual cycle regularity, Hx of infertility), Medical illnesses (DM, HPT, CVD, osteoporosis), and premenopausal symptoms (vasomotor disturbance, mood disorders, sleeps disorders).

The dependent variable was the age at cessation of menses for more than one year. The questionnaire was pre tested on 5% of the sample size ofparticipants from each facility.

Data collection procedure: Data was collected by trained BSc nurses recruited for data collection. Potential study participants (attendants and visitors) at out-patient and in-patient wards were contacted and informed about the study using the information sheet. After obtaining informed consent from eligible participants data was collected through face-to-face interview in a private area maintaining confidentiality. The study participants were recruited and included using quota sampling by serially registering and selecting the women who fulfill the inclusion criteria until the allocated sample size was fulfilled. To ensure data quality and completeness the data collection procedure was supervised by the investigators.

Data analysis: Data was entered in to Epi Info version 7.1.3 and analyzed using the Statistical Package for Social Studies (SPSS) version 25. Socio demographic, reproductive and medical variables were independent variables included in analysis. Age at menopause was the dependent variable dichotomized in to age at menopause with outcome variable of age below 45 and ≥45 years. Descriptive statistics was used to summarize and describe data. A stepwise analysis was done to see potential association and strength of association between the independent and the selected outcome variable (menopause at age ≥ 45 yrs). Variables associated with age at menopause with p-value of <0.2 in bivariate analysis were included in a multivariate model. For each of the study variables, the association was estimated by the odds ratio (OR) with the 95% confidence interval (95% CI). A P value of less than 0.05 was considered statistically significant. Figure 1 below shows that the data has come from a population where the mean age is nearly normally distributed. Hence, we have confirmed that we can apply parametric statistics. (Figure 1)

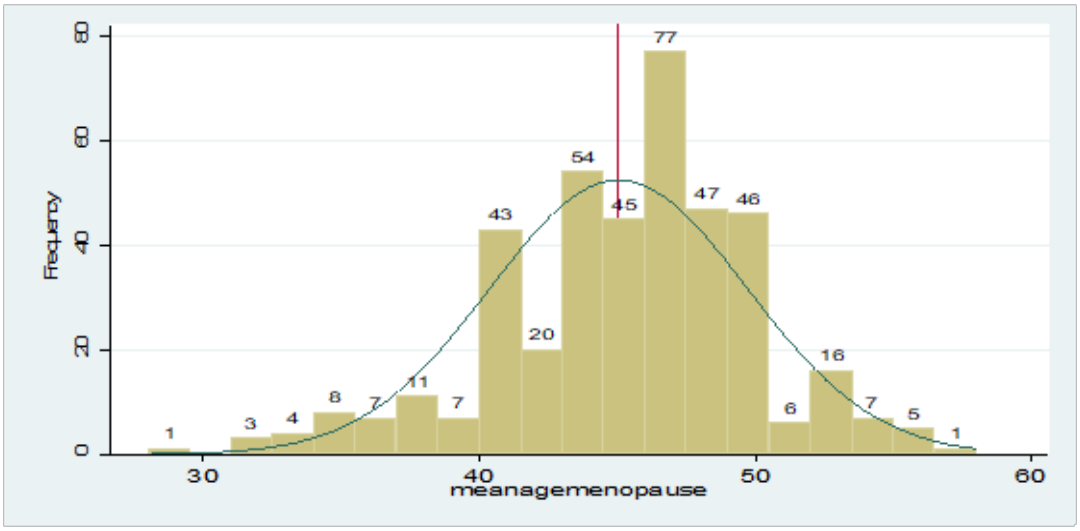

Figure 1: The age distribution of study participant post menopausal women in Addis Ababa, Ethiopia, February to March 2024. (n -408)

Operational Definitions:

Natural menopause: is recognized after 12 consecutive months of amenorrhea for which no other obvious pathological or physiological cause is present.

Patient attendant and visitors: Any woman visiting or attending or caring for (an in-patient) who is not visiting the hospital for her medical care at OPD or in any of the wards of the hospital.

RESULTS

Socio-demographic and behavioral Characteristics:

A total of 408 eligible participants were enrolled in the study. Their mean age was 51.78 ± 5.43 years while the age range was 37 to 60 years. Majority were 50years and above and urban dwellers with proportions of 51.7 % and 99.8 % respectively. Sixty percent were married. More than 77% had formal education. Only 189 (46.4%) were engaged in different outdoor work activity while others were limited to in house activities. Majority, 84.6%, were Christians. Majority, 57.4 %, had income less than 50 USD per month. Coffee drinking habit frequency was daily in 77.9% while 12.0%and 10% drink coffee occasionally and never drank respectively. Majority (51.2%) never drank alcohol while 47.8% drank occasionally and only 4(1%) drank regularly. No woman was found to have smoking history.

Age at menopause

The reported age at menopause ranged from 28 to 58 years. The mean age of menopause was 45.05 (±4.65) years. The duration of amenorrhea after the last menses among participants was between 1 and 28 years. Majority, 52.0%, had amenorrhea of 5 years and below where as 5.2 % had amenorrhea of ten years and above. Age of menopause varied significantly among participants with premature menopause (<40 years)reported in 10.0% (41) of them. Only 1.5% (6) had late menopause (≥55 yrs) while 47.3% (193) had menopause at ages 45-49 years and 12.5% (51) at age of 50-54 years. (Table 1)

Table 1. Age at menopause among post-menopausal women in Addis Ababa, Ethiopia, February to March 2024. (n-408)

Age at Menopause	Count	Percent (%)
<40	41	10.0%
40-44	117	28.7%
45-49	193	47.3%
50-54	51	12.5%
≥55	6	1.5%

Reproductive characteristics

The mean age at menarche of the participants was 14.68 (±1.44) years, and majority (91.2%) were in the age at or below 16 years, while the rest (8.8 %) had delayed menses. The reported age at giving first birth ranged 14 – 40 years while the mean age was 21.34 (± 4.681) years. Majority, 68.9%, were multiparous while 3.9% and 27.2% were nulliparous and primiparous respectively. Only 12.5 % had history of primary and secondary infertility. Menstrual pattern in the last four years before onset of amenorrheawas regular in 60.5%. More than half (51.7%) of the women used one or more type of modern contraceptive methods in their life time. Injectable, oral contraception pills, implants, IUCD and permanent methods were used by 26.2%, 21.1%, 15.0%, 7.6%, and 1.2% of the participants respectively. Past history of pelvic surgery was reported in 7.4% with cesarean section (3.7%) and myomectomy (2.5%) being the commonest.

Medical characteristics

Medical co-morbidities were reported during this period in 152 (37.25%) of the participants. Hypertension was the most frequent co-morbidity followed by diabetes mellitus andmusculoskeletal disorders reported in 91 (22.3%), 49 (12.0%) and 23(5.63%) of the participants, respectively. Other less common morbidities included RVI on ART 6 (1.5%) and cardiac diseases 4 (1%).

Peri-menopausal symptoms

Hot flushes was the commonest perimenopausal symptom experienced by almost half, 202 (49.5 %), of the participants. Night sweating 199 (48.8%), mood change 147 (36.0%), history of peri-menoausal weight gain 158 (38.7%) and sleep disturbance 128 (31.4%) were among the symptoms reported by participants. Although only 56 (27.7%) of those with hot flush were treated all improved after treatment. Similarly; though only 29.6% of participants with night sweatiness were treated nearly all (55/56) improved with treatment. Those who had mood change (depression, easily irritable) and seek care were 38 (9.3%) and for those group who were treated the symptom improved markedly in 35 (92.1 %). Participants who had history of weight gain and treated were 48 (11.8%), symptom improved markedly 46 (95.8 %). Participants who had history of sleep disturbance (insomnia) and treated were 30 (7.4%), symptom improved markedly in 26 (86.7%). In the majority of cases the frequency of symptom and health seeking behavior is unbalanced being only less than one third of all. (Table 2)

Only 214 (52.5%) of participants were sexually active. The reason for the sexually inactive was lack of desire in 71 (17.4%). Minority 15 (21.1 %) of those with lack of sexual desire were treated and most 13 (86.6%) improved. Among sexually inactive majority, 139 (71.6%), were widowed or divorced. The reason for sexual inactivity wasvaginal dryness and burning sensation in 63 (32.4%), and among them 16 (25.4%) were treated and 12 (75%) of the treated improved. (Table 2)

Table 2. Peri-menopausal symptoms experienced by post-menopausal study participant women in Addis Ababa, Ethiopia, February to March 2024. (n-408)

Variable		Frequency	Percent (%)
Had symptoms of hot flush	No	206	50.5
	Yes	202	49.5
Seek care for the hot flush (n-202)	No	146	72.3
	Yes	56	27.7
Did take treatment for the hot flush (n-56)	No	1	1.8
	Yes	55	98.2
The symptom improved after treatment (n-55)	No	0	0
	Yes	55	100
Had night sweatiness	No	209	51.2
	Yes	199	48.8
Did seek treatment for the night sweatiness (n-199)	No	140	70.4
	Yes	59	29.6
Did take treatment for the night sweatiness (n-59)	No	3	5.1
	Yes	56	94.9
The symptom improved after treatment (n-56)	No	1	1.8
	Yes	55	98.2
Had experienced mood change	No	261	64.0
	Yes	147	36.0
The mood change needed treatment (n-147)	No	109	74.1
	Yes	38	25.9
Took treatment for the mood change (n-38)	No	2	5.3
	Yes	36	94.7
The mood change improved after treatment (n-36)	No	1	2.8
	Yes	35	97.2
Had history of weight gain	No	250	61.3
	Yes	158	38.7
Did seek treatment for weight gain (n-158)	No	110	69.6
	Yes	48	31.4
Did receive treatment for the weight gain (n-48)	No	0	0
	Yes	48	100
Did weight gain improve after treatment (n-48)	No	2	4.2
	Yes	46	95.8
Faced sleep disturbance (insomnia)	No	280	68.6
	Yes	128	31.4
Did insomnia need treatment (n-128)	No	98	76.6
	Yes	30	23.4
Did receive treatment for the insomnia (n-30)	No	1	3.3
	Yes	29	96.7
Did the insomnia improve after treatment (n-29)	No	3	10.3
	Yes	26	89.7
Currently sexually active	No	194	47.5
	Yes	214	52.5
Sexually inactive due to lack of desire (n-194)	No	123	63.4
	Yes	71	36.6
Needed treatment for sexual desire (n-71)	No	55	77.5
	Yes	16	22.5
Received treatment for lack of sexual desire (n-16)	No	1	6.3
	Yes	15	93.7
Did lack of sexual desire improve after treatment (n-15)	No	2	13.3
	Yes	13	86.7
Sexually inactive due to vaginal dryness (n-194)	No	131	67.5
	Yes	63	32.5
Did vaginal dryness needs medical care (n-63)	No	47	74.6
	Yes	16	25.4
Did you receive treatment for vaginal dryness (n-16)	No	0	0
	Yes	16	100
Did the dryness improve after treatment (16)	No	4	25
	Yes	12	75

Factors affecting age at menopause

Independent variables having a p-value of <0.2 in bivariate logistic regression were transferred to multivariable logistic regression. Accordingly; family income, parity and Implant contraceptive usewere included in bivariate and then multivariable regression analysis. After multivariable logistic regression parity and implant use remained to be significantly associated with age at menopause.

Multiparty was significantly associated with 3.5 times higher odds of age of menopause of ≥ 45 yrs (AOR= 3.4, 95%CI=1.138-9.796) compared to nulliparous women. Previous implant contraceptive use was also significantly associated with 2.6 times higher odds of age of menopause of ≥ 45 yrs (AOR= 2.05, 95%CI=1.033-4.058) than non-users. (Table 3)

Table 3: Regression analysis of selected socio-demographic and reproductive variables Vs Age at menopause of ≥ 45 yrs at health facilities of participant post menopausal women, Addis Ababa, Ethiopia, Feb-March, 2024. GC. (n=408)

Characteristics	Adjusted prevalence of age at menopause of ≥45 yrs	OR for age at menopause of ≥ 45 yrs COR** P-value	95% CI	AOR*** P-value	95% CI
Family income (USD)					
< 50	57.3	1		1	
50-100	66.7	0.076	1.493 (0.960-2.322)	0.196	1.366 (0.851-2.192)
>100	66.7	.272	1.493 (0.731-3.049)	0.377	1.422 (0.652-3.102)
Parity					
0	37.5	1		1	
1	46.8	0.485	1.469 (0.500-4.319)	0.478	1.489 (0.496-4.471)
>1	68.3	0.016	3.596 (1.267-10.202)	0.028	3.339 (1.138-9.796)*
Implant use					
No	58.2	1		1	
Yes	78.7	0.003	2.650 (1.385-5.31071)	0.040	2.048 (1.033-4.058)*
IUCD					
No	60.4	1		1	
Yes	82.4	0.082	3.065 (0.867-10.841)	0.09	3.067 (.841-11.185)

*P<0.05, **COR – Crude Odds Ratio, ***AOR –Adjusted Odds Ratio

DISSCUSSION

Menopause is an inevitable occurrence during women's life. Natural age at menopause differs across the world and literature search reveled higherage in developed countries and lower in developing countries. The mean age of menopause in our study was 45 years. This finding is lower compared to many reports from developing countries and local studies. It is lower than previous local study reports of 46.7 years done in rural town Dangila and 48.78 years in Hawassa.[5, 6] However it is slightly higher than the 44.18 years mean age reported from a study done in Bahir Dar.[6] Our finding is also lower compared to reports from other countries like Nigeria (46.16 yrs), Iran (49.2yrs), Russia (50 yrs), China (48.4 yrs) and Jordan (48.5yrs) studies.[8,18,20-22] The difference for the result could partly be due to population difference.

Reports based on the limited available population-based data revealed premature menopause to occur in approximately 1% – 8.6% and early menopause in 4.9%–9.4% of women.[23-26] In the current study the prevalence of pre mature menopause (age of menopause before 40 years) and earlier menopause were 10.0% and 28.7% respectively which were higher than prior reports.[23-26] Our findings are also higher compared to large scale population based study done in China with 3.40% of premature menopause and 6.75% early menopause.[18] These differences could be due to methodology and socioeconomic status differences. Our study was a cross sectional while the above were longitudinal population based studies.

In the present study, almost half of the participants were asymptomatic while 202 (49.5 %) had hot flushes, 199 (48.8%) night sweating, 147 (36.0%) mood change, 158 (38.7%) history of weight gain and 128 (31.4%) faced sleep disturbance (insomnia). These findings are lower compared to a local study report which reported hot flushes in 65.9%, difficulty falling asleep in 49.6%, and depressive mood in 46.0%.[13] Similarly Indian and Chinese studies reported 80% and 40.8% mood disorder and 53.8% insomnia prevalence. On the other hand these studies reported lower prevalence of hot flushes with prevalences of 36.7% and 36.6% respectively.[14, 27] These differences in prevalence of symptoms potentially are related to racial differences.

Parity >1 (p= 0.022) and implant use (p=0.039) were found to be associated with age of menopause of >45yrs. Mean age of menopause of ≥ 45yrs was more than three times more likely in women with parity of greater than one (AOR=3.34, 95% CI; 1.14 -9.79). This finding is in line with many prior reports.[8, 12, 16-18,28] Similarly the odds of mean age of menopause of ≥ 45yrs was more than two times in those with use of Implant (AOR=2.05, 95% CI; 1.03 – 4.06). The finding is similar to previous studieson AAM in those using hormonal contraceptive methods.[17, 18, 20, 22] Unlike most prior studies OCP use in present study was not significantly associated with AAMmost likely due to shorter period use of OCP in our study without having the desired effect of prolonged ovarian suppression.

Many factors reported to influence the age of menopause were not seen to have effect on age at menopause in the current study. Unlike Greece and Chinese studies onoccupational statusof being a house wife didn't show the advantage of greater age of menopause, compared to those who are earning on heavy daily activity civil servants and business women.[15, 19] Intake of caffeine was also not found to be related to age of menopause. A similar finding among visitors of Hospitalized patients, caffeine consumption up to 1 cup /day was not found to affect age of menopause.[19] Those who abstain from alcohol consumption didn't show early age of menopause significantly and the finding is similar to Greece study.[19, 22] These differences could be related to the difference in the amount of coffee and alcohol consumption. Women in our study mostly consume local low alcohol concentration and less concentrated traditional coffee.

In our study unlike prior reports low educational status, early age of menarche and older age at first birth didn't show correlation to the early age of menopause.[18, 26] According to a prior study; current smoking, underweight, higher physical activity, earlier age at menarche and older age at first birth were associated with earlier age at natural menopause.[18] Age of menarche did not show significant difference by age category but twostudies in Norway, the late age of menarche more than 16 years, being parous women related to higher age of menopause.[16, 17]

Many prior studies in different countries showed that timing of menopause is influenced by many factors including genetic, diet, life style, reproductive history, body composition, general health condition, social status, level of income, education status and occupation.[8, 12, 15, 18, 29] Indian study also showed that marital status, poverty, religious, illiteracy, having never used contraceptive pills and low parity to be associated with early menopause.[28] Our finding did not demonstrate significant association of age at menopause with marital status, education, occupation, level of income, religion and ethnicity. No woman was found to smokein our study, which is a well known risk factor for early age of menopause independently.[15, 18, 21]

Strength and Limitation of the study

The strength study is that it identifies the burden of one of the neglected health issue in the country. Being a cross sectional retrospective study the main limitations is the recall bias. The other limitation is that it cannot represent the national scenario as it is done in an urban set-up only.

Conclusions and recommendations:

The mean age of menopause in our study was 45 years. The prevalence of pre mature menopause was 10.0% which is higher than most prior reports. Hot flushes was the commonest menopausal symptom. Only less than a third of women who had menopausal symptoms consulted a health provider for treatment and care. This potentially is due to lack of knowledge on availability of treatment for menopausal symptoms. Parity and use of Implants were significantly associated with age at menopause of ≥ 45yrs. Large population based studies are recommended to better identify factors associated with lower mean age at menopause and high prevalence of premature menopause in the study area.. The newly identified association between age at menopause and Implant also needs further well designed study. Awareness creation on menopause in the population should be done to increase their health seeking behavior and minimize the risks and disease that are associated with menopause.

Ethical approval and consent to participate:

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Dept. of Obstetrics and Gynecology, College of Health Sciences, Addis Ababa University (Ref. No: DRPC 2024/01/03). Permission was also obtained from the study facilities to collect data. Informed consent was acquired from every participant before participation.

List of abbreviations:

AAM: Age at Menopause;
EM: Early Menopause;
PM: Premature Menopause;
OCP: Oral Contraceptive Pills;
EDHS: Ethiopian Demographic and Health Survey;
SVD: Spontaneous Vaginal Delivery

Authors contributions:

BB contributed to the conception of the study, design, data collection, analysis, interpretation of the data and write-up of the manuscript. EK was involved in the conception, design, analysis, and write-up of the final manuscript. AG was involved in design, discussion and manuscript review. All authors read and approved the final manuscript.

Availability of data:
The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of interest:
The authors declare that they have no competing interests.

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A MONOCHORIONIC DIAMNIOTIC TWIN PREGNANCY COMPLICATED BY UMBILICAL CORD ENTANGLEMENT AFTER A SPONTANEOUS SEPTOSTOMY: A CASE REPORT

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ABSTRACT

BACKGROUND: Umbilical cord entanglement is typically associated with monochorionic monoamniotic twin pregnancies and is very rare in monochorionic diamniotic (MCDA) twins unless a spontaneous septostomy occurs. We reported an unsual case of twin still births because cord entanglement in a pregnancy previously confirmed as MCDA, with septostomy identified only after delivery

CASE PRESENTATION: A 31 year old, Gravida 3 Para 2, Ethiopian woman with twin pregnancy was followed at Abebech Gobena Maternal and Child Health Hospital, Ethiopia. A detailed fetal scan at 26 weeks and 5 days confirmed a MCDA twin pregnancy with normal findings for both fetuses. She subsequently received biweekly antenatal evaluations to monitor growth, amniotic fluid, and uterine artery Doppler, that were unremarkable until 36 weeks of gestational age. Elective delivery was planned at 37 weeks. At 36 weeks and 6 days, she presented with two hours of pushing down pain and reported decreased fetal movement for three days. Ultrasound revealed intrauterine fetal demise of both twins. She delivered vaginally, and postpartum examination demonstrated umbilical cord entanglement and disruption of the intertwin membrane, consistent with spontaneous septostomy.

CONCLUSION: This rare case emphasizes the importance of maintaining clinical suspicion for spontaneous septostomy in MCDA pregnancies, as the resulting functionally monoamniotic environment can lead to catastrophic complications such as cord entanglement. Continued surveillance and heightened awareness are essential to facilitate timely intervention and reduce fetal morbidity and mortality in these high risk scenarios.

KEYWORDS: Spontaneous septostomy, Ethiopia, cord entanglement, IUFD, Fetal target scan.

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INTRODUCTION

Monoamniotic twins are at an increased risk of umbilical cord entanglement, a condition linked to higher rates of perinatal morbidity and mortality. Umbilical cord entanglement is strongly associated with negative perinatal outcomes[1,2]. Early identification of cord entanglement in monoamniotic and suspected pseudomonoamniotic twin pregnancies through sonography, along with individualized treatment, results in a notable enhancement in perinatal outcomes[3–6].

Pseudo monoamniotic twins are an intrauterine rupture of the membranes that normally divide the amniotic cavities in a diamniotic twin pregnancy, causing the pregnancy to behave as if it were monoamniotic. This condition leads to perinatal complications that are similar to those seen in genuine monoamniotic pregnancies[3,7–9].

Herein we present a case of a monochorionic diamniotic (MCDA) twin pregnancy complicated by spontaneous septostomy leading to cord entanglement of both twins. Regrettably, the cord entanglement was only detected after delivery, resulting in the loss of both twins. Although some literature has described this as a rare occurrence, to the best of the authors' knowledge, no such cases have been documented in Sub-Saharan countries like Ethiopia.

Case Presentation

A 31 year old Gravida 3 Para 2, (both alive), was referred from a local health center to Abebech Gobena Maternal and Child Health Hospital at 26weeks 5days of gestation (dated from a 15wks US scan) with a diagnosis of twin pregnancy. She had her follow up care at the Maternal Fetal Medicine unit of the Obstetrics and Gynecology of the hospital until delivery.

A fetal target scan was performed confirming a monochorionic diamniotic twin pregnancy with a clearly visible dividing membrane (Figure 1), and both fetuses had no structural anomalies. There were no sonographic evidences for Twin to Twin Transfusion or Twin Anemia Polycythemia Sequence.

She has been attending antenatal care follow ups every two weeks to monitor fetal growth, amniotic fluid, uterine artery Doppler's, and other aspects of antepartum surveillance with no abnormal findings until 36 weeks of gestation. During this time, she was supplemented with one tablet of ferrous sulfate ($FeSO_4$) daily and received two doses of the Td vaccine. All baseline investigations were normal, and there was no history of invasive intrauterine procedures like amniocentesis, infection, maternal abdominal trauma, or any chronic medical conditions such as hypertension, diabetes, or heart disease.

At her last antenatal visit at 36 weeks of gestation, the dividing membrane was visible, and both fetuses were in a cephalic presentation with estimated fetal weights of 2.1 kg and 2.3 kg, respectively. The single deepest pocket was 4 cm and 3.5 cm for each fetus, normal umbilical and middle cerebral artery Doppler. Both had reassuring biophysical profile. She was scheduled for elective delivery at 37 weeks. However, at 36 weeks and 6 days, she presented with complaints of pushing down pain of 2hours and decreased fetal movement for 3 days. On ultrasound, both fetal heartbeats were absent. Labor progressed and she delivered vaginally.

The birth outcome was Twin A, weighing 2 kg, and Twin B, weighing 2.4 kg, both male stillborn with grade II maceration. The placenta was delivered by controlled cord traction. The placenta showed one chorion, two amnion, and two cords, each with a cord length of approximately 48 cm. A true knot involving both umbilical cords was identified, with the cords of the two twins found entangled with each other (Figure 4). No retro-placental clot was noted, and the placenta weighed 500 grams. Her postnatal course was smooth. The cause of intrauterine fetal death (IUFD) was umbilical cord entanglement, which occurred after spontaneous septostomy and was identified during the postpartum period.

Figure 1. Sonographic image showing the thin dividing membrane (0.17cm) that separates the two amniotic cavities in a monochorionic diamniotic twin pregnancy at 26 weeks and 5 days.

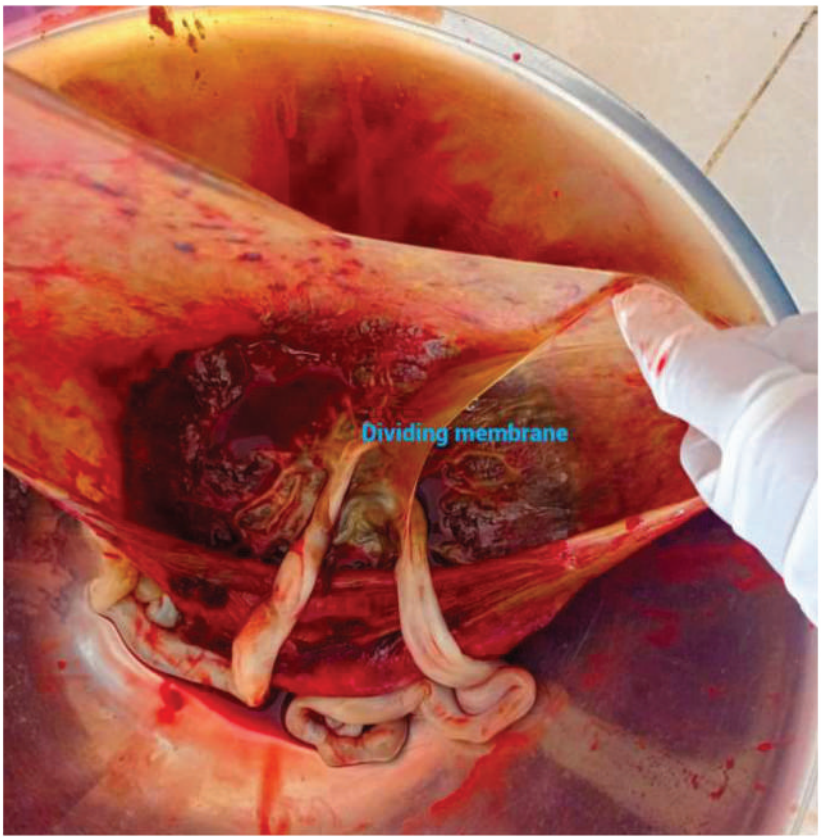

Figure 2. An image showing a monochorionic diamniotic twin placenta with a thin amniotic fetal membrane (shown as the dividing membrane) intersecting the two centrally inserted and closely positioned umbilical cords.

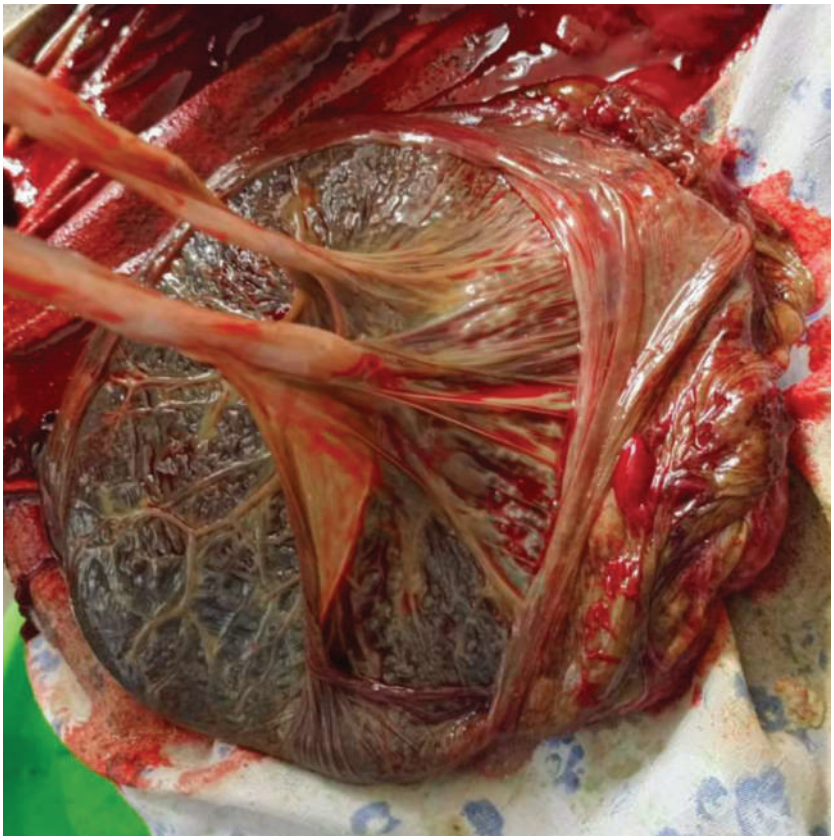

Figure 3. An image of a monochorionic diamniotic twin placenta, featuring two centrally inserted and closely positioned umbilical cords.

Figure 4. An image showing a monochorionic diamniotic twin placenta with entangled umbilical cords. Grade 1 meconium stained amniotic fluid is visible on the umbilical cords and the examiner's gloves, indicating fetal compromise.

DISCUSSION

The management of a twin pregnancy during the antenatal period is partially guided by the ultrasound characteristics of the dividing membrane. Monoamniotic twinning accounts for about 5% of monochorionic twin pregnancies [4,6,10–12].

Systematic prenatal assessments utilizing ultrasound and color Doppler indicate that nearly all monoamniotic twins experience cord entanglement and verify that these twins share a single amniotic sac. Umbilical cord entanglement is the primary cause of fetal death in pregnancies involving monoamniotic twins and a pseudomonoamniotic setting. Consequently, the identification of umbilical cord entanglement can influence the management of the pregnancy[1,2,13].

Recent improvements in perinatal outcomes in monoamniotic twin are credited to early antenatal detection of umbilical cord entanglement, administration of corticosteroids, enhanced fetal surveillance, timely elective delivery and appropriate pediatric care. These measures have resulted in a reduction in perinatal loss to nearly 10%, which is significantly lower than the previously quoted risk of 30-70% for MCMA twins.[4–6,11,14,15]

Even if the pregnancy is initially diagnosed as diamniotic, membrane rupture can occur spontaneously, transforming the pregnancy into a functionally monoamniotic one, which significantly increases the risk of cord entanglement and fetal death.[7,10,16,17]

Spontaneous disruption of the dividing membrane in MCDA twins can result from several factors, including invasive intrauterine procedures such as amniocentesis, intrauterine infection, fetal trauma to the membrane, developmental abnormalities, or maternal abdominal trauma. This entity may indeed be more prevalent than previously thought; however, the exact incidence of spontaneous septostomy of the dividing membrane in monochorionic twins remain uncertain[7–9,18–22].

However, none of these factors were present in our case and the exact etiology for this intrauterine disruption is unknown. We observed that the proximity of the cord insertion site, potentially coupled with fetal movement, might have caused rubbing that led to the rupture of the intertwin dividing membrane.

Conclusion

This rare case highlights the critical need to maintain clinical suspicion for spontaneous septostomy and the resulting potential for a functionally monoamniotic environment, which can lead to serious complications such as cord entanglement, even in pregnancies previously confirmed as monochorionic diamniotic by ultrasound. Heightened clinical vigilance is essential to guide timely intervention, especially when the pregnancy is near term, to reduce fetal morbidity and mortality in such high-risk scenarios.

DECLARATIONS

Ethics approval and consent to participate

Ethical approval for the publication of this case report was obtained from the Institutional Review Board of Yekatit 12 Hospital Medical College (Y12HMC). Data were collected after obtaining written informed consent from the mother. Data collection was confidential and no personal identifiers, such as name and phone number, were requested. All methods were performed in accordance with the relevant ethical standards and guidelines.

Consent for publication

All authors have read and approved the final version of the work and agree to its submission and publication.

Competing interests

The authors declare that they have no competing interests.

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AN INCIDENTAL INTRAOPERATIVE DIAGNOSIS OF RUPTURED SUBCAPSULAR LIVER HEMATOMA SECONDARY TO HELLP SYNDROME: A CASE REPORT

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ABSTRACT

Subcapsular liver hematoma (SLH) though rare, poses a significant risk to maternal health in patients diagnosed with HELLP (hemolysis, elevated liver enzymes, low platelets) syndrome. We report a case of a 29-year-old Gravida 4, Para 2+1(Term 2, Preterm 0, Living 2, Abortions 1) woman at 31 weeks gestation who presented with severe right upper quadrant abdominal pain, nausea and vomiting. Intraoperative findings during an emergency caesarean for fetal compromise revealed an incidental ruptured subcapsular liver hematoma. The patient underwent a successful conservative management and had an uneventful recovery. This case emphasizes the importance of preparedness for unexpected intraoperative complications among women with hypertensive disorders of pregnancy-particularly HELLP syndrome.

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INTRODUCTION

HELLP syndrome represents a severe form of preeclampsia affecting 0.5-0.9% of pregnancies and up to one-fifth of those with severe preeclampsia[1]. First described by Weinstein in 1982, HELLP is characterized by hemolysis, elevated liver enzymes and low platelet count[2]. Risk factors include multiparity, maternal age above 25years, previous history of preeclampsia and chronic hypertension. One of its rare complications is Subcapsular liver hematoma (SLH) with an incidence of rupture ranging from 1/40,000 to 1/250,000 pregnancies[3]. The right hepatic lobe is most frequently affected due to its anatomical and vascular characteristics. The clinical presentation of SLH is often nonspecific but includes right upper quadrant or epigastric pain, nausea, vomiting and signs of circulatory compromise[4]. Prompt recognition and a multidisciplinary approach are essential for maternal and fetal survival. This case highlights an incidental intraoperative diagnosis of ruptured SLH in a patient with HELLP syndrome emphasizing the need for heightened surgical vigilance during obstetric emergencies.

Case presentation

A 29-year-old Gravida 4, Para 2+1(Term 2, Preterm 0, Living 2, Abortion 1) at 31weeks gestation presented with a 12-hour history of severe right upper quadrant pain, nausea and vomiting. The pain was dull, radiating to the back and right shoulder. She had no history of trauma, fever, heartburn or yellowish discoloration of the eyes. She reported no vaginal bleeding or leakage of liquor and was appreciating fetal kicks. She had received regular antenatal care with no prior history of hypertension, liver disease or bleeding tendencies.

On examination she was fully conscious, afebrile, with the following vital signs: blood pressure of 200/140 mmHg, pulse rate 98beats/minute, respiratory rate of 22breaths per minute, temperature of 36.8°C and oxygen saturation of 97% at atmospheric air. She had mild bilateral pedal edema. The sclerae were anicteric and there was no pallor. The cardiovascular and respiratory systems were unremarkable.

Abdominal examination revealed tenderness in the right upper quadrant and a symphsio-fundal height of 29cm.The fetus was in cephalic presentation with a fetal heart rate of 164 beats per minute. The uterus was soft and non-tender. There were no palpable contractions at the time of examination. No organomegaly was detected. No fluid thrill or shifting dullness was demonstrable. Genital examination revealed normal external genitalia, the vagina was warm and moist and cervix posterior, firm, closed and long.

Neurological examination revealed brisk but symmetrical deep tendon reflexes. No abnormal movements were observed.

Investigations revealed a urinalysis with 4+ proteinuria, blood tests showed thrombocytopenia (96x103/µL), anemia (Hb 9.2g/dl), elevated liver enzymes (AST 319IU/L, ALT 329IU/L). Renal function tests were normal.

An obstetric ultrasound scan showed a live singleton intrauterine fetus corresponding to an average gestational age29 weeks with reduced amniotic fluid (Amniotic fluid index of 4.9) but normal umbilical artery and middle cerebral artery doppler studies.
A diagnosis of Pre-Eclampsia with Severe features with HELLP syndrome was made.

She was started on Intravenous Hydralazine 5mg stat for blood pressure control and Magnesium Sulphate (4gram loading, 1g/hour maintenance for 24hours) for seizure prophylaxis. A salvage dose of antenatal steroid (Dexamethasone 12mg) Intramuscular was administered for fetal lung maturity.

A non-stress test done showed persistent fetal tachycardia (180beats/minute) with reduced variability prompting an emergency caesarean section.

Laboratory findings

A summary of laboratory findings at admission showed thrombocytopenia, anemia, with markedly deranged liver function but normal renal function tests. These improved on subsequent reviews on day 3 and day 7 of puerperium as shown in table 1 below.

Table 1: laboratory findings

Test	Results			Reference range
	20th/Feb/2024	22nd/Feb/2024	27th/Feb/2024	
CBC				
WBC	10.3	13.1	10.3	12-15x103/ µL
HB	9.2	12.4	11	12-16g/dl
RBC	2.5	2.4	2.79	2.5-4.6x106/ µL
Platelets	96	116	125	150-450x103/ µL
RFTs				
Urea	16.5	15	13.9	16-48mg/dl
Creatinine	0.66	0.7	0.53	0.7-1.2mg/dl
LFTs				
AST	319	113	63	<30units/litre
ALT	329	189	52	<25units/litre
RBS	5.4mmol			3-7mmol/litre

Abbreviations:

CBC- Complete Blood Count
HB- Heamoglobin
RBC- Red Blood Cell count
RFTs- Renal function tests
LFTs- Liver function tests
AST- Aspartate transaminase
ALT- Alanine transaminase
RBS- Random blood sugar

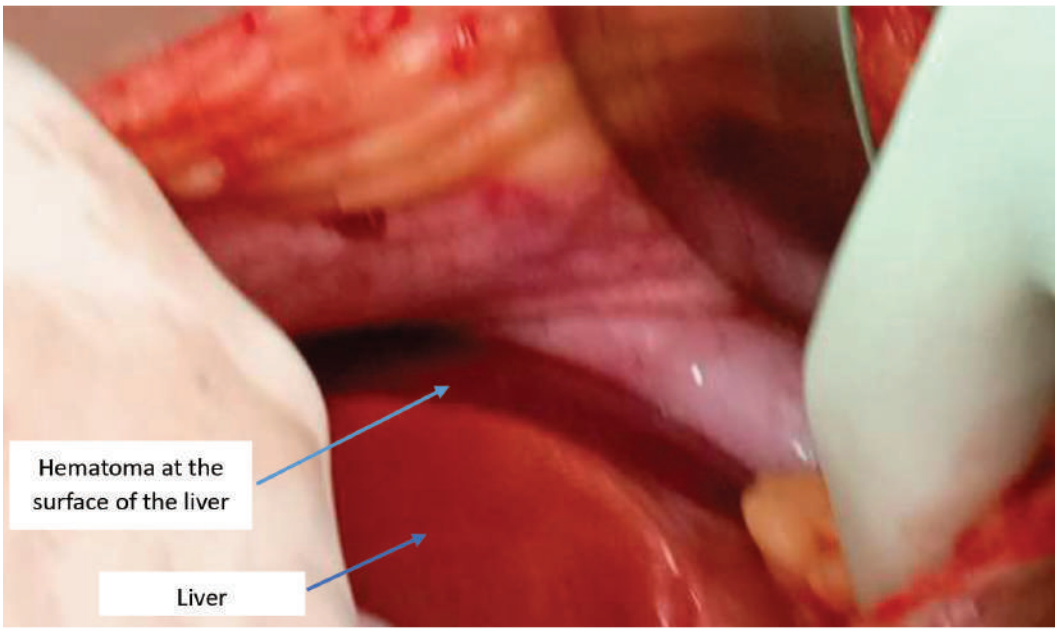
Intraoperative findings

With the client under general anesthesia, the abdomen was opened through a Pfannenstiel incision. There was approximately 200 mls of hemoperitoneum. A live female infant weighing 1.9kgs with an Apgar score of 7 and 9 at 1 and 5minutes, respectively, was delivered. The uterine incision was closed in layers and hemostasis achieved. During exploration for the bleeding source, persistent oozing along the right paracolic gutter prompted extension of the suprapubic incision to a midline incision. A 5x6 cm ruptured subscapular hematoma of the right hepatic lobe was identified and packed with absorbable Surgicel Nu-Knit® hemostat (an oxidized regenerated cellulose). The uterus and adnexa were intact. Intraoperative transfusion included two units of packed red cells, one unit of fresh frozen plasma and one pool of platelets. The patient left the operating theatre with stable vital signs.

The patient was transferred to the high-dependency unit for monitoring. She remained hemodynamically stable. Antihypertensive therapy was maintained with oral labetalol (200mg twice daily) and nifedipine tablets (20mg twice daily). The liver pack was left in situ and there was no need for a re-laparotomy; it was absorbed spontaneously. Follow-up ultrasound at 2 weeks post-partum showed a resolving hematoma. By day 7 post-

partum, laboratory values had normalized. She was discharged home on day 10 in good condition. At 12 weeks post-partum, she was normotensive and asymptomatic.

Intraoperative imaging



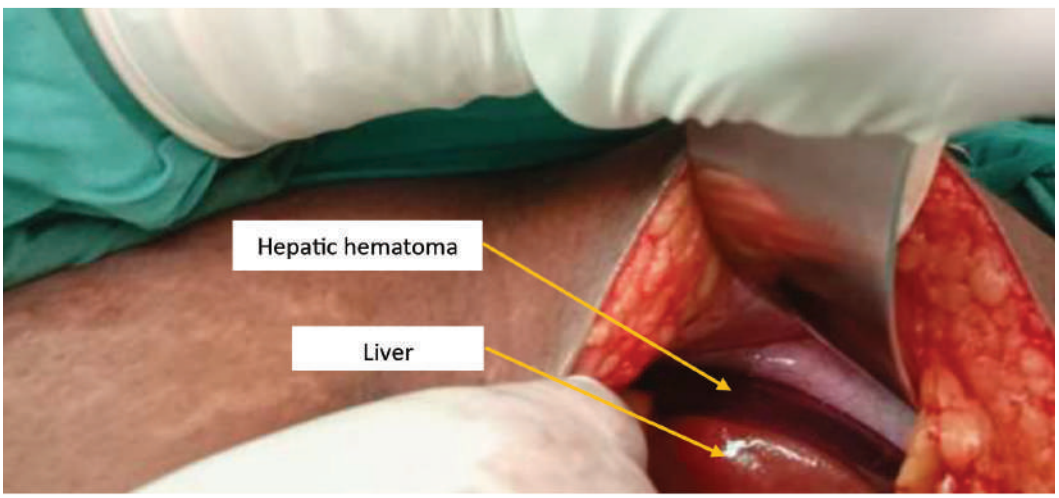


Figure 1 & 2: intraoperative findings at laparotomy showing the surface of the liver and subcapsular hematoma

DISCUSSION

This case demonstrates an incidental intraoperative diagnosis of ruptured subcapsular liver hematoma secondary to HELLP syndrome. SLH rupture is a rare complication occurring in less than 2% of patients with HELLP, with a reported incidence of 1 in 40,000 to 1 in 250,000 pregnancies[5]. Pathologically the condition is linked to endothelial injury within the microvasculature prompting platelet activation, fibrin accumulation, ischemic hepatic injury, and eventual tissue necrosis, which may progress to hematoma formation and rupture[6,7]

The condition often presents with nonspecific symptoms that may mimic other abdominal emergencies. In our case, the diagnosis was made unexpectedly during surgery, as preoperative evaluation did not indicate hepatic rupture. The classic presentation of HELLP includes epigastric or right upper quadrant pain, nausea, vomiting, and systemic signs of preeclampsia[8]. In this patient, these symptoms were accompanied by grade 1 pedal edema, severe hypertension (BP 200/140mmHg), elevated liver enzymes (AST 319 IU/L, ALT 329IU/L), and thrombocytopenia (platelet count 96,000/ul).

What makes this case particularly instructive is the intraoperative discovery of hemoperitoneum without an immediately identifiable source during caesarean section. This prompted a midline exploratory laparotomy, which confirmed the presence of a ruptured 5x6cm subcapsular liver hematoma, emphasizing the critical importance of early intraoperative recognition and surgical readiness.

In HELLP syndrome, SLH may remain undetected until rupture occurs, at which point the patient is at a high risk of hemorrhagic shock. In this case, hemorrhage was managed effectively through surgical packing with absorbable hemostats (Surgicel Nu-Knit®) and blood product transfusion, including platelets and fresh frozen plasma, which contributed to the favorable maternal outcome.

Literature suggests that the right hepatic lobe is most commonly involved, consistent with our case[9]. Mortality rates for ruptured SLH vary significantly depending on timing of diagnosis to tertiary care. Maternal mortality ranges from 17 to 59%, while perinatal mortality may reach 42%[5]

Management of HELLP syndrome and its complications is multidisciplinary, involving obstetricians, neonatologists, anesthesiologist, and often general surgeons. Delivery remains the definitive treatment for HELLP, and corticosteroids (e.g. Dexamethasone) are sometimes administered to enhance fetal lung maturity[10]. In this case, magnesium sulphate for seizure prophylaxis, antihypertensives (hydralazine, labetalol, nifedipine) and supportive critical care led to full maternal recovery and neonatal stabilization.

The decision to proceed with a caesarean section was based on fetal distress (tachycardia at 180bpm, reduced variability and no accelerations), which was prudent given the risks of delaying delivery. This case also highlights the importance of serial laboratory monitoring, which demonstrated improvement in hematologic and liver function parameters over the first postpartum week.

In summary, this case highlights the need for Intraoperative vigilance while managing HELLP syndrome patients. While a high index of suspicion is essential in symptomatic cases, this report emphasizes that unexpected intraoperative findings in the form of hemoperitoneum may also occur even in the absence of overt hepatic symptoms.

Conclusion:

Ruptured subcapsular hepatic hematoma is a rare but potential serious complication of HELLP syndrome. Intraoperative awareness and preparedness for such unexpected findings are vital

in improving maternal outcomes. Timely diagnosis, close fetal monitoring, timely surgical care with a multidisciplinary approach is crucial to optimize maternal and fetal outcomes.

Ethical Considerations

Written informed consent was obtained from the patient for the publication of this case report and the accompanying clinical images. All identifying information has been anonymized to protect the patient's privacy.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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